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ANGINA INNOCENS: A CLINICAL STUDY*

BY

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For the last eight years I have fully investigated and personally followed up a large number of patients suffering from cardiac pain. The starting-point in this investigation has been an analysis of the exact nature of the pain complained of. By observing the position of the pain, its radiation or lack of radiation, its relation to exercise, rest, emotion, and posture, it has become clear that patients with heart disease suffer from types of pain which are as characteristic and distinct as are those complained of by patients with gastric disease. These varieties of cardiac pain differ from one another according to the underlying pathological or functional condition.

The pain of coronary thrombosis is characteristic. Its onset is sudden, its severity is greatest at the start, and it tends to subside over a period of days. It may be constant during that period or may recur and remit. The pain of true angina of effort presents an equally distinct clinical picture. An intelligent patient is able to describe its exact quantitative relation to exertion—for example, a speed of one mile per hour may produce no pain, a speed of two miles per hour may result in pain after a walk of two or three hundred yards, and a faster speed or a hill will accelerate its onset. Rest invariably allows the pain to subside.

There are two further types of cardiac pain, the nature of which has not hitherto been exhaustively analysed. Spasmodic angina is an attack of cardiac pain, the onset of which may result from exercise, exposure to cold, emotion, or a heavy meal: it is relieved by amyl nitrite, but it is not exactly proportional to exertion. When once such an attack has started it will have to run its course and may increase in severity, although the patient is at rest. The nature and symptomatology of the fourth type of pain have remained unexplored: it is associated with no definite cardiac disease, is apparently of functional origin, and has a favourable prognosis.

Nomenclature

This variety of pain is the subject of the present communication. It tends to start in the left chest, frequently radiates, has no quantitative relation to exertion, and is found generally in hypersensitive or nervous subjects. The term "pseudo-angina" has in the past been applied to this syndrome; but it is a contradiction in terms, for either a patient is suffering from a pain or he is free of it. The description "neurocirculatory asthenia" is too wide, for it embraces such other symptoms as tachycardia, palpitation, and certain nervous manifestations. There appears to be no serious objection to labelling this pain "angina innocens," for this suggests the cardiac and at the same time the innocent nature of it. There is an analogy with diabetes.

It may be thought that the word angina, even though qualified by "innocens," is not desirable in view of the possible implication of severe cardiac disease. This objection is inadequate for two reasons. It often happens that a patient with angina innocens has been told that he has "angina," and the same statement is perhaps more often made to the patient's relatives. One of the patients described in this paper was told at a hospital that he was suffering from angina and would have to live a very retired life. Being introspective, the young man's mental state became such that he seriously contemplated suicide. This case shows that there may be sufficient similarity between angina innocens and angina of effort, or spasmodic angina, if a careful history is not taken, for confusion to arise. Such a label as left submammary pain is too vague. A second reason for facing the fact that the pain has many of the characteristics of an organic cardiac pain is that the patient, from hearing of acquaintances dying with substernal pain radiating to the arm, may confound the two conditions and feel that a non-committal label is an attempt at concealment or prevarication on the part of his physician. It would appear more practical and more logical, therefore, to term the condition "angina innocens," stressing the latter word.

The observations in this paper are based upon the detailed study of thirty-eight patients suffering from this type of pain who have been under investigation for varying periods since 1929. Simultaneously a study of a large number of patients complaining of the other forms of cardiac pain has served as a background, against which the present syndrome has stood out more clearly with the passage of time.

Survey of the Literature

That cardiac pain can occur in the absence of organic heart disease has long been recognized. The chief observation upon which this view is founded is that patients may not die with cardiac pain and that many recover completely. This variety of pain has been labelled in the past as pseudo-angina. Sir William Broadbent (1897), who used this term, referred to the tendency of the pain to be left-sided, localized near the apex, and associated with hyperaesthesia. But the credit for the first full account belongs to Da Costa (1871). He notes that the

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pain is in many cases constant, though it may be accentuated by exercise, and describes it as occurring in paroxysms or in the form of an intermittent lancinating stab. Stating that it is frequent after exertion, he also observes that in a few cases the pain was not accentuated during exercise but even relieved by it. Da Costa describes its localization near the cardiac apex and its radiation to the left arm, and lays stress upon the presence of hyperaesthesia, which often made the pressure of military accoutrements exceedingly unpleasant. Finally he notes that the heart rate may be fast in the erect position and slow when the patient is recumbent. Very little has since been added to this description.

Friedlander and Freyhof (1918) mention the frequency of sore throats as an aetiological factor, refer to the left-sided pain and hyperalgesia, and bring out the fact that palpitation, nervousness, and giddiness are common in these patients. Danielopolu (1927) considers that although there are cases of non-organic angina they are very rare. He states that the condition is commoner in women, and stresses the precordial hyperaesthesia, marked tachycardia, violent palpitation, and other evidence of an abnormal function of the vegetative nervous system. He also remarks that the disease is not fatal, but that it is very difficult to distinguish it from organic angina. Paul White (1931) writes: "The precordial pain is a dull or heavy ache as a rule, lasting for hours and not radiating. But occasionally it is interspersed with sharp stabbing sensations. A substernal oppression is unusual, though circulatory asthenia may, and in fact frequently does, complicate angina pectoris." An interesting analysis of patients belonging to this group was made by Doris Baker (1930). Her series was collected from a hospital out-patient department; it comprised thirty-two cases in which there was a history of up to twenty-nine years, and twenty others. In these cases there was a history of rheumatism in only six; there is no mention of the frequency of sore throats or of other specific infections. The patients apparently had normal cardiovascular systems, except that in ten there was high blood pressure and in four mitral stenosis. They were generally of the thin, anxious type. The pain was worse after exertion, having no quantitative relation to it; in most cases it was a dull ache, though a sharp stab was occasionally complained of. It was accentuated when the patient was tired. Exhaustion, as in the present series, was a prominent symptom; sighing and palpitation were frequent. Fainting was said to be unusual. The chief physical change was hyperaesthesia, which was present in 68 per cent.

Diagnostic Criteria

The usual criterion for differentiating harmless from harmful anginal pain has in the past generally been the physical condition of the heart. If there is evidence of cardiac disease it has been assumed that the cardiac pain is related to it; in the absence of abnormality it has been assumed that the cardiac pain has no organic origin. This method of approach appears to me to be in some ways illogical. It is well known that anginal pain may be caused by obstruction to the coronary flow by a syphilitic aortitis, that in these cases the heart may show no abnormality when examined by all available means, and that the pain frequently subsides as a result of vigorous anti-syphilitic treatment. Here there is no doubt that the pain is due to an organic lesion. Moreover, it is illogical to assume that pain has no organic basis until a definite physical change can be found, for the sensitivity of the nervous system varies so much that a lesion which in one individual produces no symptoms can, in a more sensitive person, give rise to severe pain. In the latter case the pain may be prominent when the underlying organic basis is so insignificant as to escape detection by any method of examination.

Three criteria have been used here for the diagnosis of angina innocens: first, that the pain is not proportional to exercise; secondly, that there is no evidence of cardiovascular disease; and, thirdly, that the course of the disease in patients observed carefully proves its innocent nature. The absence of cardiovascular disease was demonstrated clinically, electrocardiographically, and radiologically. The absence of any deleterious lesion is shown by the following facts with regard to twenty-one of the thirty-eight cases. Six of the patients have recovered, four of these having been seen five years after the observed presence of the pain. Eight patients improved or were no worse after five years, and one after three years. Seven were so young as to make it hardly possible that they could be suffering from coronary disease, their ages being 12½, 15, 15, 16, 17, 17, and 20 years. This last patient of 20, in spite of attacks of pain, had been for months in the habit of cycling distances of sixty to eighty miles each week-end.

In order to give a wider view of the syndrome sixteen more cases with pain of an identical character have been added to the above twenty-one. They consist of eight cases in which the observed duration of the pain has been less than three years and eight of organic heart disease. The latter group is of particular interest: three patients with mitral disease have suffered from an angina innocens type of pain for five years; three with hyperpiesis have remained otherwise well for four years, and one with hyperpiesis for three years. In the last case the pain was also associated with a microcytic anaemia, and disappeared when this was treated. In the remaining patient the only sign of a cardiac lesion was a P–R interval of 0.22 of a second. The fact that these latter patients have remained reasonably well, and with no signs of failure in spite of organic heart disease, is additional proof that this particular type of pain is "innocent."

Methods of Examination

In all cases a full history was taken. In the past history the following points were specifically investigated: rheumatic fever, growing pains, chorea, scarlet fever, tonsillitis, diphtheria, syphilis, and the history of the puerperium. Note was also taken of other diseases or surgical operations. A history of previous mental stress or trouble was not specially inquired into. The following symptoms were investigated in each patient: pain, dyspnoea, sighing, orthopnoea, feeling of constriction, palpitation, exhaustion, cough, giddiness, dyspepsia, state of the bowels, catamenia, frequency of micturition. With regard to the pain the points elicited were: its character, position, radiation, duration, relation to exercise and emotion. The patients were asked whether the pain occurred during exercise, in a quantitative manner, or whether it would be worse when the exercise had been finished; also whether it was ever present when they were resting or in bed. Inquiry was made about their present and past work, their ability to play games, to walk (with special reference to hills), to climb stairs, and to run; and also the quality of their sleep and their habits as regards smoking and alcohol.

Physical examination included special notice of: the presence of dyspnoea, orthopnoea, cyanosis, pallor, pulsation, clubbing of the fingers, and tremor; the pulse rate (in twenty-three cases the pulse rate and blood pressure were measured, both standing and lying); the state of the peripheral arteries and veins. The heart was examined by inspection, palpation of the apex beat, palpation of the praecordium for abnormal impulse or thrills; the position of the apex beat; the area

of cardiac dullness; and the sounds were noted. Precordial hyperaesthesia was tested for in every case, and the lungs and abdomen examined. An electrocardiograph was taken, and in some cases repeated. The Wassermann test was done. A six-foot film of the heart was taken, the contour of the heart noted, and the heart–chest ratio measured.

Age and Sex Incidence

Of the thirty-eight patients who were examined twenty-two were females and sixteen males. The ages at which the syndrome manifested itself were as follows: of the twenty-two females eleven were between the ages of 36 and 46; ten of the sixteen males were between 41 and 55. Four males and five females were between 12 and 25 years of age. The youngest female was a girl of 15. In one case the onset was between the ages of 56 and 65.

Past History

In the past history two facts stand out. The first is the high incidence of rheumatic infections and tonsillitis, and the second the frequency of psychological disorders. In twenty of the thirty-eight patients there was a rheumatic history; rheumatic fever occurred in seven, growing pains in twelve, chorea in two, and scarlet fever in six. Twenty-one of the thirty-eight patients had had definite tonsillitis. In twelve of these the sore throat had been recent, and in nine there was a history of sore throat in the past. In the latter group one patient had had sore throats for twenty years, two for twelve years, and one until tonsillectomy at the age of 21. No quinsies were noted, the tonsillar inflammation being apparently more likely to run the course of the recurrent hyperaemic type of inflammation found in acute rheumatism. No definite relation was found between an attack of tonsillitis and the onset of cardiac pain. Nor was there evidence that tonsillectomy relieved the pain. In one case angina innocens appeared immediately after an attack of rheumatic fever and persisted for eighteen months.

Sixteen of the thirty-eight cases had had definite psychological difficulties. Two had attended the Maudsley Hospital. Six had suffered from severe domestic worry and depression. Two complained of severe night terrors and nightmares. One had been a sleep-walker and had been in the habit of diving off the end of his bed. One had had a functional hemiplegia, and another functional dysphagia and dyspnoea. One had seen Sir Henry Head for psychasthenia, and three had suffered from various phobias—syphilophobia, cardiophobia, and agoraphobia. A history was obtained of the following diseases: syphilis, adequately treated in three cases; influenza in two; and diphtheria, typhoid, paratyphoid, malaria, jaundice, diabetes, nephritis, asthma, epilepsy, mucous colitis, and gonorrhoea—each in one case.

Symptoms

In addition to the precordial pain the other symptoms were as follows. Marked lassitude was complained of in thirty cases; this was the outstanding symptom, apart from pain; it was severe, and almost invariably more complained of than shortness of breath. If the question, "Which causes you the most trouble, tiredness or shortness of breath?" was put the answer would almost invariably be "tiredness." Shortness of breath of a not very pronounced degree occurred in twenty-nine cases. Orthopnoea was found in seven cases, one of them a case of mitral stenosis and one of hyperpiesis: in the other five the symptom was not prominent. Palpitation was complained of by twenty-nine patients. It was precordial in position, being generally felt over the apex beat. It was not, as a rule, noticed at the base of the throat, as is often the case in paroxysmal tachycardia or in patients with hyperpiesis. Giddiness was a symptom in twenty-seven cases, and faintness, without loss of consciousness, in seven. Thirteen patients gave a history of fainting; in eleven of these the syncope immediately succeeded a sudden severe attack of left-sided precordial pain, generally radiating to the left arm. The details of this syndrome will be discussed later. It is thus apparent that twenty of the thirty-eight patients suffered from vasomotor attacks. Sudden painful stabs, possibly due to premature beats, were complained of by ten patients: a dull, left-sided precordial ache often followed these.

Twenty-nine patients complained of a sense of constriction. This was generally left-sided and was not of the typical substernal central variety found in organic disease of the coronary vessels. A feeling of heaviness over the left praecordium was a commoner symptom than a sense of internal pressure or suffocation. Sighing, in spite of its frequency in patients with neurocirculatory asthenia, had not been consciously noticed except by four patients, although it is probable that had careful respiratory tracings been taken the respiratory irregularity demonstrated in cases of neurocirculatory asthenia by Paul White would probably have been found more often. Dyspepsia was present in fourteen cases, and in several appeared to be a predisposing or trigger symptom, for successful treatment of the dyspepsia generally led to considerable diminution in the severity of the cardiac pain. In no case, however, could it be said that the dyspepsia was the cause of the cardiac pain.

Character and Position of the Pain

In thirty-three out of thirty-eight cases the pain was felt on the left side of the chest, either over the apex of the heart or higher over the praecordium. It was felt in the mid-line by five patients. Radiation to the left arm was present in twenty-six cases and to the left shoulder in five. In twelve the pain remained localized. The relation of the pain to exercise is one of the most characteristic and important points in the symptomatology. There was no quantitative relation to exercise in any one of these patients. Although it could be said that in twenty-four of them the pain was increased as a result of exertion, there was no definite quantitative increase with more, or decrease with less, exercise; moreover, in most of these patients the pain was chiefly noticed when the exercise had ceased, and generally persisted for some hours afterwards. In some cases, for example, a hard day's washing or other physical exercise could be performed, but this would subsequently be followed for a period of hours or even days by a left-sided dull precordial pain. The pain also tended to be produced or accentuated by excitement in sixteen cases: a mother complained that this was so when she was worried about her children. Standing produced the pain in seven cases; and in twenty it was present at night when the patient was in bed. In two cases it appeared to be related to food. The duration of the pain was variable. In four cases the attacks would only last for a period of less than ten minutes, but in the majority they would persist for some hours, and in one-third of the cases for days. Soreness of the chest, or hyperaesthesia, or intolerance of precordial pressure (such as might be produced by braces or by hard objects in a breast pocket) was definitely associated with the pain. This soreness was always accentuated after a severe attack. The dull ache and the associated soreness might follow the sudden momentary stabbing pains described above.

Syncopal Type of Angina Innocens

The following cases are examples of a special syncopal type of angina innocens in which the pain starts over the praecordium, or rarely in the mid-line, and radiates to the arm. The onset is almost always abrupt, though most patients are able to reach a chair or a couch in time to sit down. The period of pain, which is long enough to be remembered and to allow of the radiation to the arm to be noticed, is followed by an attack of fainting or faintness; the sharpness of the pain is believed by most of the patients to be the cause of the fainting attack. The loss of consciousness may not be complete. In several cases these syncopal attacks were the first manifestations of the commoner type of angina innocens described above. Generally the attacks are somewhat infrequent, but in one case amounted occasionally to ten a day.

In this patient the attacks had been spread over a period of six years, and at the end of that time the heart was apparently perfectly normal.

A second patient was seized with a sudden attack of precordial pain while washing, became dizzy and half unconscious, but managed to get back to bed. The pain in this case started in the left chest, radiated to the left arm, and lasted for about half a minute.

The third patient was seized with an attack soon after rising, and ascribed it to excitement at the prospect of seeing relations.

The fourth patient had four attacks in eight months: the attacks lasted for the unusually long period of ten to fifteen minutes before she lost consciousness; the onset was sudden, and the pain started in the praecordium and radiated through to the back. At this time the pain came on only with the syncopal attacks, although previously she had typical precordial pain after exercise. She had made a complete recovery when seen eleven months later.

The fifth patient had a severe sudden pain in the left chest, radiating to the left axilla, not to the arm, and then fainted.

The sixth patient had fainted two or three times, but only in association with precordial pain, which preceded the attack by a few seconds.

The seventh patient, while getting her husband's breakfast, had a sudden precordial pain, which passed down the left arm, and a sense of tightness in the throat. There was also a feeling of precordial constriction, and she then fainted.

The eighth patient, while stooping down to clean a stove, was seized with a sudden severe attack of pain in the chest, radiating to the left arm, and felt very faint. Subsequently she had several similar attacks, one in church, associated with fainting.

The syndrome was found in twelve other patients. It would appear that this type of attack often accompanies severe mental or psychological stress: two of the patients stated that their domestic life was unhappy, one suffered from syphilophobia, one had had epilepsy, and one had been treated for "psychasthenia." Standing and excitement appear to be immediately predisposing factors.

Physical Findings

Examination of the heart in thirty-eight cases of angina innocens gave the following results. The apex beat was internal to the mid-clavicular line in thirty-five. In three it was displaced to the left: two of these had hyperpiesis, and the third was suffering from a microcytic anaemia which cleared up under treatment. Precordial hyperaesthesia was present in twenty-four cases out of thirty-eight. This was frequently very marked, and might be localized to the apex or be more diffusely spread over the left precordial region: some patients winced when the praecordium was palpated. In eight cases the heart sounds were abnormal; in three of these there was a mitral stenosis and in one mitral regurgitation; in one case a systolic murmur was heard at the apex, and in another a systolic murmur which was loudest at the apex and conducted to the aortic base. No abnormality was discovered in the lungs. In thirty-seven cases the abdomen was normal, but in one tenderness was present over the right renal area.

The blood-pressure findings in this series of cases of angina innocens are worth careful attention. In thirty-one cases the recumbent systolic and diastolic pressures were normal. In five the blood pressure was subnormal; in two there was some hyperpiesis, which responded to dietetic treatment in one instance. In twenty-eight cases the blood pressure was taken with the patient in two positions: after recumbency for five minutes, and again after assumption of the erect posture for two or three minutes. In twenty-five of these patients there was a marked fall in the systolic pressure in the erect posture, which was associated as a rule with an increase in the heart rate. The average fall for the twenty-five cases was 21 mm. Hg, and this was accompanied by an average increase in the pulse rate of ten beats a minute. The maximum fall was 50 mm. Hg, but this was in a patient with hyperpiesis. In three instances no change in the blood pressure or the pulse rate was observed in readings taken standing and lying. These findings are somewhat significant in view of the frequency of giddiness and fainting attacks in angina innocens.

Radiography disclosed abnormality in four cases, and some slight prominence of the pulmonary conus in the patients with mitral stenosis. In none of these three was there any gross deviation from the normal. Two of the patients with left ventricular enlargement had hyperpiesis. In twenty-nine cases the electrocardiographic tracing was normal; in eight there was some abnormality. These cases all showed left axis deviation, which in five was physiological for the age of the patient. In no instance was there any abnormality of the T waves. In one case the tracing is lacking. The Wassermann reaction was negative in twenty-nine cases; in eight the blood was not examined; and in one patient who had previously had a positive reaction the result was now negative.

Differential Diagnosis

The pain of angina of effort is characteristic, and a careful history will in all cases differentiate the condition from angina innocens. If pain is only complained of as occurring during exertion, if it is related to exertion and never arises at rest or at night, it may be taken that the patient is not suffering from angina innocens but from angina of effort.

A group of patients suffering from pure angina of effort is at the present moment the subject of another investigation. In thirty-seven of these there is no history of gross mental abnormality or psychological instability, such as was found in some of the patients with angina innocens. In thirty-three there is definite organic cardiovascular disease; one patient was probably so affected, and the remaining three were diabetics, in which condition coronary atheroma is frequently found.

The presence or absence of radiation to the arms is of no help in differential diagnosis, and although the pain of angina of effort is in the majority of cases central this is not absolutely constant. In angina innocens, however, the pain is left-sided in nearly every case. Lassitude as a marked symptom, in contradistinction to shortness of breath, has already been stressed, and it can again be stated that the lassitude in angina of effort, though present

in some degree, is not severe. Palpitation is prominent in angina innocens and was complained of by twenty-nine out of the thirty-nine patients, whereas in only nine of those with angina of effort was this at all severe, though three admitted to having suffered from it in a slight degree. Fainting or syncopal attacks strongly support the diagnosis of angina innocens, for none of the thirty-seven patients with angina of effort suffered from these, their only analogous symptom being in the case of hyperpietics, some temporary dizziness after stooping, or on rising suddenly. Seventeen of the patients with angina innocens gave a history of fainting and none of those with angina of effort did so. Orthopnoea is a point in favour of angina of effort, for twelve of the thirty-seven patients complained of it in a marked degree and two slightly. Definite evidence of cardiovascular disease suggests angina of effort, and in the complete absence of all clinical, radiological, and electrocardiographical evidence of organic cardiovascular disease angina innocens is the more likely diagnosis; this is, of course, not conclusive, for a slight coronary lesion may obviously be present in a sensitive individual or in syphilitic aortitis and yet be physically undiagnosable. Mitral stenosis is an exception to the above rule, for patients with this lesion, when they suffer from cardiac pain, complain of pain of the angina innocens type. The blood pressure in angina innocens is generally normal, subnormal, or shows a definite tendency to vary with posture; that in angina of effort is frequently raised.

There should be no difficulty in distinguishing this condition from coronary thrombosis. The syncopal type of angina innocens, starting with a severe attack of precordial pain and followed by faintness or a syncopal attack, may possibly suggest this diagnosis in some cases. There is, however, very rarely any loss of consciousness in coronary thrombosis. The absence of fever, cardiac enlargement, leucocytosis, and any electrocardiographic abnormality will confirm the diagnosis.

Paroxysmal tachycardia or auricular flutter may at the onset of an attack be associated with cardiac pain radiating to the arm and with faintness or fainting. Here a very high heart rate, which shows no variation from minute to minute, is characteristic. The electrocardiograph will again clinch the diagnosis.

The syncopal type of angina innocens may suggest an epileptic attack with a visceral aura. The onset, however, is less abrupt than that of epilepsy. The patient generally has time to reach a chair or a couch before losing consciousness. There is a sufficient period to allow of the type of pain being recognized, and later described. The tongue is not bitten. Convulsions do not occur. There is no incontinence of urine. The course of the disease is unlike that of epilepsy, for there is no progressive increase in the severity of the symptoms. The patients, on the other hand, generally show steady, if slow, improvement. (Since completing the above study I have seen a patient who suffered both from epilepsy and from angina innocens. In no instance were her attacks of epileptic unconsciousness associated with the presence, or any exacerbation, of the cardiac pain.)

Other Types of Cardiac Pain

If it be conceded that the pictures of angina of effort and of angina innocens are sufficiently distinct, anyone with experience of patients with cardiac pain will agree that these two conditions do not account for all cases. Spasmodic angina is one condition in which a severe attack of cardiac pain arises. The exciting cause may be exercise, anger, or possibly some digestive upset. The characteristic of the attack is that when it has once started it has, in the words of one patient, "to run its course." It would appear as though the exercise or emotion started some definite pathological mechanism and that the pain persisted till such mechanism had ceased. The therapeutic action of amyl nitrite in these attacks suggests that spasmodic angina may be due to coronary spasm. The present investigation has as yet thrown no definite light on the mechanism of spasmodic angina, but it has served to show clearly that there is such a symptom-complex, and that this can quite easily be recognized. More work is necessary before any deductions can be made as to why some patients with angina of effort also suffer from attacks of spasmodic angina, or why a patient with angina innocens very occasionally appears also to suffer from these attacks. It would seem to be sufficient for the time being to analyse and to separate out the two clinical entities of angina of effort and angina innocens.

Possible Mechanism of the Pain

It is difficult to understand how the pain of angina innocens is produced. There is quite obviously no coronary disease. The severe spasmodic type of attack may just possibly be associated with some temporary coronary spasm, but of this there is as yet no evidence. The known factors which may be concerned with the production of pain in these cases are worth enumerating. There is no doubt that the angina innocens type of pain is that found exclusively in those patients with mitral stenosis who suffer from cardiac pain. There may be some analogy between these cases of mitral stenosis and those with angina innocens and an apparently normal heart. In mitral stenosis the left ventricle is contracting in an abnormal manner. The diastolic filling of the chamber is probably somewhat reduced, so that the systole tends to be over-emphatic. The high-pitched, accentuated first sound, and the slight but persistent degree of tachycardia, bear witness to this continuous cardiac over-action. In these circumstances the patient's heart or praecordium may become gradually sensitive to the persistent knocking and the sensation may ultimately be magnified into pain.

A second factor is an over-active central nervous system, due to psychological or endocrine factors. The vasomotor system is also unduly labile: the sagging of the blood pressure in the erect position, the history of syncopal attacks, and, finally, the curious association between a severe attack of pain and an almost immediate fainting attack, all suggest this system may be at fault. A final factor, the mechanism of which still remains obscure, is the known association between chronic infection and "irritable heart." In Da Costa's experience the infection was largely of a dysenteric nature, but in the present series of cases it would appear to have been pharyngeal.

Prognosis

Of the thirty-eight cases twenty-one have already been considered from the prognostic point of view in determining the criteria for the establishment of the syndrome, angina innocens. If all thirty-eight cases are analysed with reference, not to the period during which they have been under personal observation, but to the length of time they have suffered from the pain, it is found that some have recovered and that most have definitely improved. Six patients have completely recovered; twenty have improved—in two of these there is a history of pain for fifteen years, in eight for seven to nine years, in four for six years, and in five for two years. In eight the pain

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The syndrome was found in twelve other patients. It would appear that this type of attack often accompanies severe mental or psychological stress: two of the patients stated that their domestic life was unhappy, one suffered from syphilophobia, one had had epilepsy, and one had been treated for "psychasthenia." Standing and excitement appear to be immediately predisposing factors.

Physical Findings

Examination of the heart in thirty-eight cases of angina innocens gave the following results. The apex beat was internal to the mid-clavicular line in thirty-five. In three it was displaced to the left: two of these had hyperpiesis, and the third was suffering from a microcytic anaemia which cleared up under treatment. Precordial hyperaesthesia was present in twenty-four cases out of thirty-eight. This was frequently very marked, and might be localized to the apex or be more diffusely spread over the left precordial region: some patients winced when the praecordium was palpated. In eight cases the heart sounds were abnormal; in three of these there was a mitral stenosis and in one mitral regurgitation; in one case a systolic murmur was heard at the apex, and in another a systolic murmur which was loudest at the apex and conducted to the aortic base. No abnormality was discovered in the lungs. In thirty-seven cases the abdomen was normal, but in one tenderness was present over the right renal area.

The blood-pressure findings in this series of cases of angina innocens are worth careful attention. In thirty-one cases the recumbent systolic and diastolic pressures were normal. In five the blood pressure was subnormal; in two there was some hyperpiesis, which responded to dietetic treatment in one instance. In twenty-eight cases the blood pressure was taken with the patient in two positions: after recumbency for five minutes, and again after assumption of the erect posture for two or three minutes. In twenty-five of these patients there was a marked fall in the systolic pressure in the erect posture, which was associated as a rule with an increase in the heart rate. The average fall for the twenty-five cases was 21 mm. Hg, and this was accompanied by an average increase in the pulse rate of ten beats a minute. The maximum fall was 50 mm. Hg, but this was in a patient with hyperpiesis. In three instances no change in the blood pressure or the pulse rate was observed in readings taken standing and lying. These findings are somewhat significant in view of the frequency of giddiness and fainting attacks in angina innocens.

Radiography disclosed abnormality in four cases, and some slight prominence of the pulmonary conus in the patients with mitral stenosis. In none of these three was there any gross deviation from the normal. Two of the patients with left ventricular enlargement had hyperpiesis. In twenty-nine cases the electrocardiographic tracing was normal; in eight there was some abnormality. These cases all showed left axis deviation, which in five was physiological for the age of the patient. In no instance was there any abnormality of the T waves. In one case the tracing is lacking. The Wassermann reaction was negative in twenty-nine cases; in eight the blood was not examined; and in one patient who had previously had a positive reaction the result was now negative.

Differential Diagnosis

The pain of angina of effort is characteristic, and a careful history will in all cases differentiate the condition from angina innocens. If pain is only complained of as occurring during exertion, if it is related to exertion and never arises at rest or at night, it may be taken that the patient is not suffering from angina innocens but from angina of effort.

A group of patients suffering from pure angina of effort is at the present moment the subject of another investigation. In thirty-seven of these there is no history of gross mental abnormality or psychological instability, such as was found in some of the patients with angina innocens. In thirty-three there is definite organic cardiovascular disease; one patient was probably so affected, and the remaining three were diabetics, in which condition coronary atheroma is frequently found.

The presence or absence of radiation to the arms is of no help in differential diagnosis, and although the pain of angina of effort is in the majority of cases central this is not absolutely constant. In angina innocens, however, the pain is left-sided in nearly every case. Lassitude as a marked symptom, in contradistinction to shortness of breath, has already been stressed, and it can again be stated that the lassitude in angina of effort, though present

in some degree, is not severe. Palpitation is prominent in angina innocens and was complained of by twenty-nine out of the thirty-nine patients, whereas in only nine of those with angina of effort was this at all severe, though three admitted to having suffered from it in a slight degree. Fainting or syncopal attacks strongly support the diagnosis of angina innocens, for none of the thirty-seven patients with angina of effort suffered from these, their only analogous symptom being in the case of hyperpietics, some temporary dizziness after stooping, or on rising suddenly. Seventeen of the patients with angina innocens gave a history of fainting and none of those with angina of effort did so. Orthopnoea is a point in favour of angina of effort, for twelve of the thirty-seven patients complained of it in a marked degree and two slightly. Definite evidence of cardiovascular disease suggests angina of effort, and in the complete absence of all clinical, radiological, and electrocardiographical evidence of organic cardiovascular disease angina innocens is the more likely diagnosis; this is, of course, not conclusive, for a slight coronary lesion may obviously be present in a sensitive individual or in syphilitic aortitis and yet be physically undiagnosable. Mitral stenosis is an exception to the above rule, for patients with this lesion, when they suffer from cardiac pain, complain of pain of the angina innocens type. The blood pressure in angina innocens is generally normal, subnormal, or shows a definite tendency to vary with posture; that in angina of effort is frequently raised.

There should be no difficulty in distinguishing this condition from coronary thrombosis. The syncopal type of angina innocens, starting with a severe attack of precordial pain and followed by faintness or a syncopal attack, may possibly suggest this diagnosis in some cases. There is, however, very rarely any loss of consciousness in coronary thrombosis. The absence of fever, cardiac enlargement, leucocytosis, and any electrocardiographic abnormality will confirm the diagnosis.

Paroxysmal tachycardia or auricular flutter may at the onset of an attack be associated with cardiac pain radiating to the arm and with faintness or fainting. Here a very high heart rate, which shows no variation from minute to minute, is characteristic. The electrocardiograph will again clinch the diagnosis.

The syncopal type of angina innocens may suggest an epileptic attack with a visceral aura. The onset, however, is less abrupt than that of epilepsy. The patient generally has time to reach a chair or a couch before losing consciousness. There is a sufficient period to allow of the type of pain being recognized, and later described. The tongue is not bitten. Convulsions do not occur. There is no incontinence of urine. The course of the disease is unlike that of epilepsy, for there is no progressive increase in the severity of the symptoms. The patients, on the other hand, generally show steady, if slow, improvement. (Since completing the above study I have seen a patient who suffered both from epilepsy and from angina innocens. In no instance were her attacks of epileptic unconsciousness associated with the presence, or any exacerbation, of the cardiac pain.)

Other Types of Cardiac Pain

If it be conceded that the pictures of angina of effort and of angina innocens are sufficiently distinct, anyone with experience of patients with cardiac pain will agree that these two conditions do not account for all cases. Spasmodic angina is one condition in which a severe attack of cardiac pain arises. The exciting cause may be exercise, anger, or possibly some digestive upset. The characteristic of the attack is that when it has once started it has, in the words of one patient, "to run its course." It would appear as though the exercise or emotion started some definite pathological mechanism and that the pain persisted till such mechanism had ceased. The therapeutic action of amyl nitrite in these attacks suggests that spasmodic angina may be due to coronary spasm. The present investigation has as yet thrown no definite light on the mechanism of spasmodic angina, but it has served to show clearly that there is such a symptom-complex, and that this can quite easily be recognized. More work is necessary before any deductions can be made as to why some patients with angina of effort also suffer from attacks of spasmodic angina, or why a patient with angina innocens very occasionally appears also to suffer from these attacks. It would seem to be sufficient for the time being to analyse and to separate out the two clinical entities of angina of effort and angina innocens.

Possible Mechanism of the Pain

It is difficult to understand how the pain of angina innocens is produced. There is quite obviously no coronary disease. The severe spasmodic type of attack may just possibly be associated with some temporary coronary spasm, but of this there is as yet no evidence. The known factors which may be concerned with the production of pain in these cases are worth enumerating. There is no doubt that the angina innocens type of pain is that found exclusively in those patients with mitral stenosis who suffer from cardiac pain. There may be some analogy between these cases of mitral stenosis and those with angina innocens and an apparently normal heart. In mitral stenosis the left ventricle is contracting in an abnormal manner. The diastolic filling of the chamber is probably somewhat reduced, so that the systole tends to be over-emphatic. The high-pitched, accentuated first sound, and the slight but persistent degree of tachycardia, bear witness to this continuous cardiac over-action. In these circumstances the patient's heart or praecordium may become gradually sensitive to the persistent knocking and the sensation may ultimately be magnified into pain.

A second factor is an over-active central nervous system, due to psychological or endocrine factors. The vasomotor system is also unduly labile: the sagging of the blood pressure in the erect position, the history of syncopal attacks, and, finally, the curious association between a severe attack of pain and an almost immediate fainting attack, all suggest this system may be at fault. A final factor, the mechanism of which still remains obscure, is the known association between chronic infection and "irritable heart." In Da Costa's experience the infection was largely of a dysenteric nature, but in the present series of cases it would appear to have been pharyngeal.

Prognosis

Of the thirty-eight cases twenty-one have already been considered from the prognostic point of view in determining the criteria for the establishment of the syndrome, angina innocens. If all thirty-eight cases are analysed with reference, not to the period during which they have been under personal observation, but to the length of time they have suffered from the pain, it is found that some have recovered and that most have definitely improved. Six patients have completely recovered; twenty have improved—in two of these there is a history of pain for fifteen years, in eight for seven to nine years, in four for six years, and in five for two years. In eight the pain

has persisted with remissions and relapses, and is on the whole unchanged. One of this final group has had symptoms for twelve, two for seven, three for four to five years, and two for two years. It is thus apparent that the prognosis is very good as regards life; but it is also shown that the symptoms on the whole tend to be chronic. This chronicity, when considered in conjunction with the absence of evidence of physical disease, suggests very strongly that, although there may be some slight physical basis, the nervous or functional element preponderates. It is also clear that pain of this type has no bad prognostic significance, even if the patient is suffering from an organic cardiac lesion.

Conclusions

1. A cardiac pain of an anginal nature is described, the characteristics of which enable it to be differentiated as "innocent": the term "angina innocens" is suggested.

2. The differentiation of angina innocens from other types of cardiac pain is described.

3. An account is given of a syncopal variety of the syndrome.

4. The prognosis as regards life is good, but the duration of the pain, with remissions, is often protracted.

5. Factors possibly concerned in the production of the pain are discussed.

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M. Sallick (*Ann. Surg.*, November, 1936, p. 853) has investigated the late results in seventy-four cases of acute perforated peptic ulcer treated by simple suture alone. In the majority of cases at least three years had elapsed since operation, and in no case was the post-operative period less than one year. All the patients were male, and during the last ten years it was noted that not a single case of acute perforation of peptic ulcer occurred in a female. The youngest patient was 19 and the oldest 67, the largest number of cases being in the 30–40 age period. The majority of acute perforations were found in gastric ulcers, forty-one being situated proximal to the pylorus, twenty-six lesions were in the duodenum, and seven were found at the pylorus. All the duodenal perforations were on the anterior surface or superior border of the intestine; of the stomach perforations four were through its posterior wall into the lesser cavity, and the remainder were equally divided between the lesser curvature and the anterior surface. In the series sixty-two patients (86 per cent.) had a history of typical ulcer symptoms, and diagnosis was easy in nearly every instance. Operation consisted of simple closure in three layers except for three cases, in which a single suture layer only was used. Only six cases were drained. There were eight deaths in the series, the highest mortality rate being noted in patients over 50. The mortality percentage was found to rise directly and sharply with delay in operation. Follow-up results were obtained in forty-five of the total sixty-six patients who survived operation, and it was seen that twenty-nine were found to have had further gastric trouble, a recurrence of 64 per cent. It is considered that the low mortality rate and excellent early results warrant the use of simple closure as a routine procedure in cases of acute perforation, but further medical or surgical care will be required in most instances.

PREVENTION OF DISEASE IN INDUSTRY*

BY

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Industrial medicine is the practice of medical supervision, preventive medicine, and public health within the confines of an industry. Its aim is to safeguard the health of the employee and to minimize time lost from work because of sickness or of accidents. Though one of its functions is treatment it is mainly an advisory and preventive service. The industrial medical officer has to co-operate with managers, workers, engineers, chemists, and architects. He has to discover faults in the working environment and try to find remedies. One of his most interesting duties is to bring into the effective service of industry the discoveries of the research worker.

The Factory Department of the Home Office is constantly engaged in effective and progressive work for the prevention of disease in industry. It numbers on its staff men and women who are among the greatest living authorities on different aspects of industrial hygiene and toxicology. Their profound store of knowledge, constant helpfulness, and unfailing courtesy industry sometimes fails to appreciate to the full. It is important that doctors should have the special knowledge and training which enables them to offer advice to the employer as to how his industry may be carried out in safety. At present, with a few exceptions, it is only the medical inspectors of factories who have this knowledge. No doubt with the growth of this branch of preventive medicine more doctors will make themselves competent in this interesting work.

The main principles underlying the prevention of disease in industry can be summarized under fifteen headings.

1. Protection of the Workman by Law

In this country the number of diseases notifiable under the Factory and Workshops Acts and subject to compensation under the Workmen's Compensation Acts indicates the existence of an alert and enlightened legislature. From 1878 onwards provisions were made to control dangerous trades by so-called special rules of the Home Office. The early knowledge of industrial diseases was obtained by placing an obligation on the medical practitioner and employer to notify them to the Chief Inspector of Factories. Between 1896 and 1927 anthrax, toxic jaundice, epitheliomatous ulceration, chrome ulceration, chronic benzene poisoning, and poisoning by lead, phosphorus, arsenic, mercury, carbon bisulphide, and aniline were made notifiable. The scope of the Workmen's Compensation Acts is wider than that of the Factory Acts, as they are intended to cover all cases of sickness of strictly occupational origin, the individual being considered and not merely the conditions under which he works. There are now some thirty-eight scheduled diseases, and of these the diseases of miners and dermatitis alone constitute more than 90 per cent. of the cases compensated. New occupational risks constantly arise; asbestosis and dioxan poisoning can be quoted as dangers recently brought under control. Sometimes great expansion will occur in one trade, as was the case with the manufacture of accumulators from 1922 to 1924 owing to an increase in the use of motor cars and wireless apparatus. Such expansion of an industry makes great demands on those responsible for the prevention of disease in the factories concerned.

* Introductory remarks to a discussion on occupational diseases, Medical Society of London, March 22, 1937.

2. Medical Inspection Under State Support

In this country medical examination of entrants into industry, required by law and carried out by certifying surgeons, is very limited in extent, and applies only to young persons between the ages of 14 and 16; but it was undoubtedly the forerunner of the much more extensive voluntary medical examination now frequently undertaken. An increasing number of employers are realizing the advantages of some kind of medical service in the factory. An additional measure of protection applied in many industries is the periodic medical examination of any workers exposed to known risks. This may be at weekly, fortnightly, monthly, or quarterly intervals, and may be carried out by the certifying surgeon or an appointed surgeon approved by the Chief Inspector. These examinations are chiefly undertaken in the case of work involving exposure to lead, to carbon bisulphide, to benzene and other fumes in india-rubber works, and to chromic acid in chromium plating. After the war a number of medical men were appointed to work as whole- or part-time works doctors, with happy results, but there is a need for the employment of a still greater number. They can often detect intoxication before disability is produced. Thus examination of the blood for punctate basophilia is of extreme value in the prophylaxis of plumbism, and is indeed essential if the occurrence of manifest plumbism is to be avoided. Similarly, in the earliest stages of benzene poisoning the platelet count and white cell count may fall, and before tetrachlorethane poisoning appears elevation of the white cell count may be found. Facilities should be available for periodic medical examination and for repeated radiographs of the lungs in persons exposed to the risk of pneumonoconiosis.

3. Prevention of Dust and Fume

Dangers from dust and fume may be removed by the application of local or general exhaust ventilation. As Sir Thomas Legge emphasized, "unless and until the employer has done everything—and everything means a good deal—the workman can do nothing to protect himself, although he is naturally willing enough to do his share." Wherever possible exhaust ventilation through hoods must be applied at the point of origin of the dust or fume. It is in use in the manufacture of electric accumulators and of white lead, in the manipulation of silica and asbestos, and of carbon bisulphide and benzene in india-rubber works. In certain instances general as opposed to local exhaust ventilation is applied. Good examples of this are the ventilation of dope rooms and of cellulose-spraying shops, where it is obviously impracticable to apply local exhausts direct to each doping bench or spraying horse. In dusty lead processes, such as mixing and pasting in the manufacture of electric accumulators, and the breaking down of the white-lead stack, the hose-pipe must be freely used to reduce dust to a minimum. The breaking down of white-lead stacks in a dry state must be forbidden, and white lead should be converted direct into an oily pulp without dry grinding. The use of dry sandpaper for the removal of paint must be forbidden, and wet waterproofed sandpaper must be substituted. A preventive method which has been widely applied in the mining, metallurgical, and ceramic industries is the substitution of wet methods for the original dry screening, grinding, milling, and mining processes. Dry drilling is the cause of most of the dustiness in mining, and; while wet drilling does not ensure a dust-free atmosphere, it reduces dustiness very considerably. In the grinding industries where sandstone wheels are used there should be a continuous stream of water running over them. In dusty trades respirators should be used where possible, but it is usually difficult to get the men to wear them.

4. Protective Apparatus Uncontrollable by the Workman

Sir Thomas Legge used to emphasize that in the prevention of disease in industry, "if you can bring an influence to bear external to the workman—that is, one over which he can exercise no control—you will be successful; and if you cannot or do not you will never be wholly successful." In the case of exhaust ventilation it is usually a simple matter to have the machinery operating the fans outside the workshop altogether. Even so, the protective apparatus may not be fool-proof, as in the case of the workman in a grinding shop who can turn back the hood from his grinding wheel for use as a receptacle for tools, thus making the whole apparatus ineffective.

5. Education of Workman as to Nature of Danger

Sir Thomas Legge used to insist that "all workmen should be told something of the danger of the material with which they come into contact, and not be left to find it out for themselves, sometimes at the cost of their lives." The factory physician should insist on the necessity of teaching the workman to take an interest in protecting himself. He should be taught the importance of clean habits in lead works, and should be made to understand such things as the principles of dust suppression. For example, he should know that a vacuum cleaner is used to remove dust from a workshop for his protection, and should therefore never be employed with the motor reversed. Cautionary placards and illustrated notices should be used in the workrooms concerned so that the early lesions of the skin in anthrax and in chrome ulceration are familiar to all. To ensure the prompt treatment of anthrax an individual card has been devised for workers employed in industries exposing them to risk. In case of illness this is presented to the doctor as a hint that the possibility of anthrax should be considered. It is of vital importance to train men in safe methods of artificial respiration so that these can be employed promptly in cases of carbon monoxide poisoning. The factory physician must never agree to a scheme where the workmen are kept ignorant of the poisonous nature of substances handled. In the war American workmen were told that trinitrotoluene might indeed explode, but was otherwise harmless. This attitude was a distressing obstacle to those who tried to introduce into American plants the safeguards which had been successfully adopted in this country.

6. Cleanliness of Work Places

In some dangerous trades constant vigilance by a staff of good foremen is necessary. In the manufacture of trinitrotoluene absorption through the skin cannot be prevented unless benches, tools, floors, and walls are kept spotlessly clean. Similarly, glaze rooms and dipping rooms in the potteries, accumulator pasting shops, and all rooms in which a dusty lead process is carried on must be wet-cleaned every night to prevent the inhalation of dust of compounds of lead. Where it is impracticable to use a wet process—as, for example, in the manufacture of litharge—the foremen must see that no dust is raised in shovelling.

7. Bodily Cleanliness

Cloakrooms, washing rooms, messrooms, baths, nail-brushes, towels, and soap must be provided by the employers and used in their time. Where absorption is known to occur through the skin, as in the use of aniline,

nitrobenzene, and trinitrotoluene, appropriate protective clothing must be worn. If direct contact with the poison cannot be avoided every means must be adopted to protect the skin. The surface which is necessarily exposed may be covered with a bland ointment, dusted with powder, or washed frequently. There is a risk in too much washing of the skin, and care must be taken in such cases to use the least irritating cleansers, to avoid scrubbing, and to replace the lost oils of the skin by inunction with an animal fat.

8.—General Hygiene

There are certain principles which apply to all trades but are of greater importance in the dangerous trades, because to neglect them may increase the susceptibility of the worker to the poisons concerned. Measures must be taken to prevent long hours of work, the employment of boys and girls, undue heat from furnaces and steam from tanks, and the use of underground workshops and bad lighting and ventilation. In this country the law requires that every factory and workshop shall be kept clean and free from effluvia, provided with sufficient means of ventilation, and kept at a reasonable temperature. It does not, however, contain any provisions as regards lighting. If domestic conditions were always of the standard required by law for a factory or workshop the health of the general population would certainly be improved. It is not suggested that the conditions existing in every factory or workshop in this country are by any means perfect, but in the majority a good standard has been attained. During the war it was realized that hygienic surroundings, good ventilation and lighting, facilities for obtaining food at a reasonable cost, and opportunity for rest and recreation were not only good for the worker but to the advantage of the employer. The benefits derived from such improvements have served to stimulate the provision of further facilities for workers to enjoy a healthy life. Except in the special rooms set aside for the purpose, smoking, eating, and drinking must be forbidden in certain works—for example, lead works. Otherwise a man might carry a compound of lead on his fingers to his cigarette and perhaps inhale a dangerous amount.

9. Improvements by Chemists

The simplest method of preventing an industrial disease is to prohibit the use of the toxic substance which causes it. The possibility of such prohibition depends on the finding of an innocuous substance competent to replace the noxious one. In the case of yellow phosphorus, workers in the match industry were completely protected by the introduction of a harmless substitute in phosphorus sesquisulphide. The substitution of silver salts for mercury for the silvering of mirrors provides another example of the introduction of a harmless substance in place of a harmful one. Chemists have produced a low solubility glaze which protects the potter from the dust of white lead, and in a similar way paint technologists have protected the painter of metals by the invention of a non-setting red lead. The use of plastic rubber—that is, rubber in which litharge has been incorporated in a mother batch to the extent of 90 per cent.—will abolish the production of lead dust in certain processes in the rubber industry. Extraction with sulphuric acid or oxidation will reduce or completely remove the carcinogenic activity of a mineral oil such as that used in cotton mule-spinning. Substitutes must be found for toxic solvents. Since coal-tar benzene is a highly toxic substance, the works chemist must choose less toxic solvents—for example, petroleum benzine, naphtha, and acetone. Further work is required to find, for example, a harmless substitute for nitrate of mercury in the felting of fur.

10. Improvements by Engineers

Wherever possible mechanical means should be substituted for hand carriage. Examples of this are seen in the use of cranes, rails, hoists, travelling belts, covered conveyors and hoppers, and automatic packing machinery. The abolition of hand-filling of shells, the substitution of shot-blasting for sand-blasting and of stainless steel for chromium plating, and the use of a closed-in film steam evaporator in the manufacture of silver nitrate are further examples. The invention of electroplating about 1840 led to a great diminution in the number of cases of mercury poisoning, because it replaced water-gilding, in which mercury was volatilized from an amalgam by heat over a fire. An outstanding contribution to the reduction of the risk of lead poisoning was the invention of the wet-pulping method in the manufacture of white lead: 50 per cent. of the white lead manufactured in this country is never handled in the dry state, but is converted from an aqueous pulp to an oily paste in closed-in machines. Glass-workers' cataract has been minimized by the invention of a glass-bottle-making machine producing bottles at the rate of forty a minute, and at one-ninth the original labour cost. In iron and steel rolling mills the use of goggles made of Crookes's glass protects the eyes from the fierce heat and glare, and so prevents cataract.

11. Knowledge as to Portals of Entry of Toxic Substances

Where it is known by what route—respiratory, alimentary, or cutaneous—a poison is absorbed the physician can, in consultation with the employer, indicate on what principles the methods of protection should be based. In the majority of industries absorption through the respiratory tract is of overwhelming importance. Except very rarely lead poisoning is not due to eating with unwashed hands. In a few industries absorption through the skin may take place—for example, in the handling of aniline, nitrobenzene, trinitrotoluene, nicotine, and lead tetra-ethyl. The mechanical details which render the workers in a given industry safe from toxic substances must be settled in consultation with engineers.

12. Multiplicity of Poisons in a Given Trade

A given trade may be dangerous for more than one reason. For example, in the painter's trade, lead, turpentine, benzene, and methyl alcohol may all be used, and in the rubber trade benzene, lead, and carbon bisulphide. In the leather trade there may be exposure to anthrax bacilli and to carbon dioxide, sulphuretted hydrogen, nitrobenzene, and aniline. A workman may be ignorant of the substances used or they may be trade secrets. In taking a clinical history, even when the substances are known, it is often difficult to determine which is responsible. The doctor must discover the particular department in which a man works. For example, in the rubber trade where plastic rubber is not used there is a risk of lead poisoning, but it only occurs in the mixing room, where oxides of lead are handled. In complicated processes, such as those of dye manufacture, many difficulties may be encountered in an attempt to determine which chemical compound is the responsible agent. Such is the case with the so-called aniline tumours of the bladder.

13. Limitation of Exposure

In certain dangerous processes it must be forbidden for men to stay for long periods at any one job. In lead

smelting and in processes involving exposure to carbon bisulphide, nitrobenzene, and trinitrotoluene short shifts must be enforced. Hours of work must be limited for men working in compressed air or in hot deep mines. The factory physician must make use of all known methods to detect the earliest onset of poisoning by substances such as lead, benzene, and tetrachlorethane.

14.—Selection of Immune Persons

Employment of women and of all persons under the age of 18 in certain lead trades must be forbidden. In gasworks and on blast furnaces, where there is a danger of carbon monoxide poisoning, it is better to employ middle-aged men, who are partially protected by their lesser physical activity and slower respiration. The selection and employment of only immune persons is an ideal the attainment of which must wait on better knowledge. If research could produce satisfactory tests for immunity to various poisons a great deal of suffering and expense could automatically be abolished.

15.—Further Researches

It would be idle to suppose that our knowledge of industrial diseases is a finished chapter. Many diseases of occupational origin remain unknown for years, notable instances being asbestosis and Weil's disease. Clearly there must be others still eluding our search. New processes are constantly springing up. In some countries new solvents for quick-drying paints and varnishes have been allowed to poison men, whereas they should have been first tested on experimental animals. A new method of tin refining recently produced outbreaks of arseniuretted hydrogen poisoning under circumstances which should have been condemned beforehand by chemists, since it is known that the action of water on metallic arsenides is to set free this deadly gas. Until 1933 the co-operation of geologists in attacking the problem of pneumonoconiosis had not been sought. The petrological microscope rapidly incriminated silicates such as sericite and sillimanite, whereas previously silica had been held solely responsible. Recently fluorosis of bones, a new horror of industrial medicine, was unearthed. Is this condition widespread among cryolite crushers elsewhere than in Denmark? Do bath enamellers suffer from it? What, if any, will be the ultimate consequences to bone and bone marrow of the deposition of calcium fluoride in the skeleton? Is the high incidence of malignant disease of the nasal sinuses in workers in nickel related to substances used in their work, and is there also a high incidence of lung carcinoma among them? Will the chemist find a suitable substitute for nitrate of mercury in the felting of fur? Will the bacteriologist succeed in producing effective inoculation against Weil's disease? What is to be done about Raynaud's phenomenon, produced by the use of vibrating tools, including pneumatic drills, rams, chisels, and riveting machines? Will the phenomenon, hitherto confined to women, become equally common in men? These and many other problems await solution. We are on the right path, but we have a long way to go.

The King Edward's Hospital Fund for London has made arrangements for Coronation tours of royal palaces and other historical buildings famous throughout the Empire. These privileged visits will take place on April 7, 10, 14, 21, and 28; May 19 and 28. Tickets are 10s. each or £2 10s. for the series, and the entire proceeds are devoted to the Fund. Communications should be addressed to the secretary, King Edward's Hospital Fund for London, 10, Old Jewry, E.C.2.

EPIDEMIC CATARRHAL JAUNDICE IN SCHOOL CHILDREN

BY

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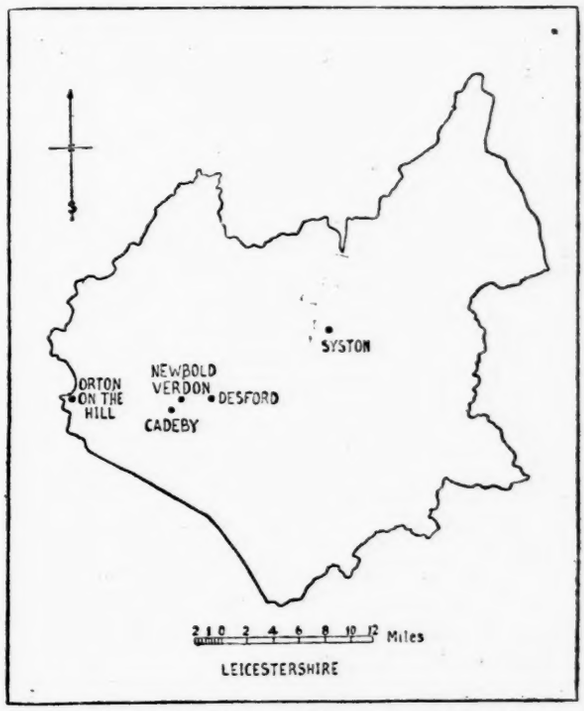
Towards the end of 1936 an outbreak of jaundice occurred in Leicestershire, the villages of Newbold Verdon, Desford, and Syston being chiefly affected. The epidemic was mild and no deaths resulted. Altogether forty school children suffered from the disease, and it is estimated that this figure represents 60 to 70 per cent. of the total number of cases, pre-school children and young adults being also affected.

The first intimation of the outbreak came from Newbold Verdon, when the head teacher of the local school reported in November that five children were absent suffering from jaundice. It was decided that I should undertake a special investigation in order to ascertain whether or not the disease was caused by the *Leptospira icterohaemorrhagiae*.

Nomenclature

Epidemics of jaundice have been recorded since ancient times and have occurred at one time or another in every part of the world. No attempt at classification was made until Weil (1886) published an account of the symptoms in a number of severe cases.



Map showing the relative position of the villages where cases of epidemic catarrhal jaundice occurred.

Cockayne (1912) went a step further and differentiated between Weil's disease and the milder type by styling the former "infectious jaundice" and the latter "epidemic catarrhal jaundice." This classification was commonly used until Hurst and Simpson (1934) produced definite evidence that there were in reality two forms of the milder jaundice, and distinguished the infective hepatic type from the epidemic catarrhal.

In November, 1914, Inada and Ido discovered that the organism responsible for Weil's disease or infectious jaun-

dice was the *Leptospira icterohaemorrhagiae*. All attempts to isolate the organism or organisms causing the other types of jaundice have so far failed.

Historical Review

Outbreaks of epidemic catarrhal jaundice are not infrequent in this country. Morgan and Brown (1927) described an extensive outbreak in the Midlands in which two hundred persons were affected and one fatality occurred. Particulars of an epidemic in Surrey were published by Booth in 1928. Two years later Pickles, outlining an outbreak of catarrhal jaundice in Yorkshire, states that in many ways it resembled the Surrey epidemic. Findlay, Dunlop, and Brown (1931) published an account of numerous small outbreaks of jaundice occurring during the two previous years in Surrey and particularly affecting elementary school children. During the same year Glover gave an account of an outbreak in an unnamed small country town in which are situated three boarding schools, all of which were affected. In 1934 Bashford published an account of an outbreak of epidemic catarrhal jaundice among the workers in several departments of the General Post Office in London.

Montford (1934) describes an epidemic in the Castle Donington district of Leicestershire in which forty-five cases were identified as acute infective jaundice, all except two being children. Frazer (1935), in reporting the occurrence of epidemic catarrhal jaundice among children in Staffordshire, states that the outbreak was of a similar nature to that which occurred during the previous year at Castle Donington, which is about fifteen miles distant.

There appears to be some uncertainty with regard to the classification of these two last-mentioned epidemics, as Barber (1937) classifies both of them as infective hepatic jaundice.

Ramage (1935) describes an outbreak of epidemic catarrhal jaundice in Holland, Lincolnshire, and estimated that 80 per cent. of the cases occurred among school children.

Incidence

The present investigation was confined to the outbreak of jaundice among school children, though, as mentioned above, this figure represents about 65 per cent. of the total number of cases, as pre-school children and adults also contracted the disease, particularly young adults between the ages of 16 and 25.

The distribution of the cases was as follows:

District	Village	Population	Number of Cases (40) Investigated
Market Bosworth R.D.	Newbold Verdon	1,251	26
Barrow-on-Soar R.D. ...	Syston	4,322	7
Market Bosworth R.D.	Desford	1,163	4
" "	Cadeby	122	2
" "	Orton-on-the-Hill	191	1

As this epidemic occurred in the autumn and winter months the seasonal incidence corresponds with that recorded in the majority of similar outbreaks.

It is also interesting to note that the age and sex incidence as shown below agrees with the findings in previous investigations in that it is evenly distributed between the sexes, and the highest incidence occurs in children between the ages of 6 and 10.

Age	Males	Females
0–5	2	3
6–10	14	15
10–15	3	3
	19	21

Aetiology

Every effort was made in an endeavour to ascertain the mode of spread of the disease.

Attention was first directed to the water and milk supplies in the villages concerned. Excepting Desford and Syston, each of which has a main water system, it was found that the sources of water supply were multiple, there being a large number of pumps, each supplying one or more houses. The children have, of course, common access to the water supply at the school which they attend, but this fact was not helpful as all the children in any one of the villages affected did not attend the same school. The sources of milk supply were equally varied, and thus no evidence was found of a likelihood that the disease was transmitted by either of these two routes.

The question of infection spreading by means of rats was also considered, but here again no definite evidence was forthcoming. During the past few years the villages have been comparatively free from these vermin; therefore any contamination of food is unlikely.

On investigating the spread among the school children several interesting facts came to light. With few exceptions the children who developed the disease gave a history of having been in close contact with other children who either had the disease at the time or developed it shortly afterwards. The contact was in most cases either a relative or another child habitually sitting in the next seat at school.

Although all those in contact with a case did not develop the disease it would appear that a very close personal contact is necessary for the spread of epidemic catarrhal jaundice, and whatever the causal organism it is no doubt transmitted by droplet infection. It would also seem almost certain that a child was infectious during the incubation period of the disease.

It was difficult to determine the probable incubation period, and although in Newbold Verdon the cases tended to occur in batches with three-day to five-day intervals between them, little can be deduced from this fact. In several instances where two children in the same family were affected there was approximately a month between the dates of the first symptoms in each case, and it is quite reasonable to assume that the second victim contracted the disease from the first. On summarizing the length of time between the date of the first symptoms and the alleged contact with the disease, it is found in the forty cases under observation that this period more nearly approaches four weeks than one week.

The distribution of the epidemic in the county was at first difficult to account for, there being no direct communication between the villages concerned, with the exception of Newbold Verdon and Desford. Investigation, however, disclosed the fact that a number of young adults from the villages work in factories some distance away. It was also learnt that cases of jaundice had occurred among these factory workers, and indeed the epidemic probably originated through this channel from some extraneous source.

Clinical History

The clinical features of the disease were remarkably constant throughout, though there was some variation in

the severity. In one instance symptoms were completely absent until jaundice appeared.

The onset was gradual, and for several days before definite symptoms developed the child complained of a headache with perhaps nausea, loss of appetite, and a feeling of lassitude and sleepiness. At this stage the tongue was usually covered with a slight fur and the breath fetid. In most cases bradycardia could be detected, while in some the face was flushed, though the temperature was found to be normal. Diarrhoea was sometimes present, but constipation was more usual. Vomiting, which is the first definite symptom, then occurs and varies in severity, some children only vomiting once, while others continued for an hour or more. This vomiting has been attributed by some writers to a duodenitis. Pain in the upper abdomen accompanied the vomiting, in several instances being so severe that the parents thought the child had appendicitis. The pain diminished as the vomiting subsided, but a slight tenderness on palpation persisted for some days over the region of the gall-bladder, which was palpable in several cases. There appeared to be a correlation between the rise in temperature and the severity of the disease, for in those cases which were febrile the symptoms were more marked.

From one to fourteen days after the acute symptoms developed jaundice appeared and the child at once began to feel better. At first the conjunctivae were affected, then the skin of the face, neck, arms, trunk, and lower limbs became yellow. In some instances the jaundice was less intense and did not spread beyond the eyes or face, while in others it was very intense and the patient exhibited the peculiar orange flush of the face that has been described in previous epidemics. About the same time as jaundice appeared the faeces became pale and the urine dark, though an occasional dark bile-stained stool was passed. Itching of the skin was only present in those children where the jaundice was widespread and deep in colour. Convalescence was complete in about a fortnight and no complications occurred.

The chief symptoms in order of frequency in the forty cases investigated are here summarized.

Jaundice	occurred in	40 cases
Faeces pale	,,	40 ,,
Urine dark	,,	40 ,,
Vomiting	,,	36 ,,
Pain in the epigastrium	,,	34 ,,
Loss of appetite	,,	34 ,,
Lassitude	,,	34 ,,
Sleepiness	,,	31 ,,
Headache	,,	30 ,,
Dizziness	,,	21 ,,
Temperature	,,	18 ,,
Rambling	,,	17 ,,
Itching	,,	12 ,,
Diarrhoea	,,	8 ,,
Sore throat	,,	1 case

Laboratory Investigation

Investigation under this heading was undertaken by the Leicester City and county laboratories. The following is a summary of the specimens submitted for examination, and the findings:

Blood.—Specimens of blood were taken from two cases, each on the sixth day of the disease. On microscopical examination of the centrifuged deposit no spirochaetes were detected. Another specimen, taken from a case on the forty-ninth day after the first symptoms developed, was also submitted and the serum, tested for agglutination against the following, proved negative in all dilutions: *B. typhosus* H and O, *B. paratyphosus* A and B, *B. dysenteriae* Sonne, *B. dysenteriae* Shiga, *B. dysenteriae* Flexner, *B. aertryche*, and *B. abortus* Bang. Blood films were taken at various stages of the disease from all the forty cases investigated and a differential count made. A number of the films showed an eosinophilia sometimes as high as 15 per cent., but as this high count is frequent in routine films taken from country children, where the cause is usually threadworms, no significance is attached to the present findings. In the majority of the films, however, a monocytosis was evident, varying from 2 to 19 per cent., while in a number of others taken from contacts who did not develop the disease the monocytic counts were normal.

Urine.—Altogether twelve specimens of urine were examined for spirochaetes where the period of the disease varied from the seventh to the thirty-third day. A centrifuged deposit from 15 c.cm. of urine was injected peritoneally into two series of guinea-pigs, all of which survived three weeks. In addition the specimens of urine, which were deeply bile-stained, were examined microscopically. An occasional leucine crystal was present in one specimen, but the others showed no leucine or tyrosine crystals, red blood corpuscles, or casts. No spirochaetes were found in any centrifuged deposit.

Faeces.—A specimen from a typical case was collected in the acute stage and submitted for examination for any abnormal bacteria. The result was negative.

In my opinion the above results can be accepted as definite evidence against the epidemic being either of spirochaetal origin or due to any of the other possible organisms for which tests were carried out.

Differential Diagnosis

Weil's Disease (*Spirochaetosis icterohaemorrhagica*).—Weil (1886) was the first to publish an account of this disease. Since then a number of similar outbreaks have been described and referred to as Weil's disease, but it was not until 1914 that the disease as described by him became definitely linked with the *Leptospira icterohaemorrhagiae*. In November of that year two Japanese workers, Inada and Ido, inoculated a guinea-pig with blood from a patient suffering from the symptoms of Weil's disease, and subsequently discovered the spirochaete in the animal's liver. Since then a good deal of work has been done in various epidemics, notably that by Dr. Adrian Stokes during the great war, who proved that rats carried the organism. Many outbreaks of spirochaetal jaundice have occurred on the Continent and in Asia. With regard to this country, outbreaks of Weil's disease are very rare. Buchanan and Gulland (1923) report the finding of the spirochaete in the blood and urine of miners in East Lothian who were suffering from jaundice. Since then other small outbreaks in Scotland and England have been reported. The onset of the disease is sudden and is ushered in with general malaise, severe headache, violent muscular pains, giddiness, loss of appetite, high fever, epistaxis, and usually diarrhoea. The symptoms become more acute as the disease progresses, and nervous disturbances increase, delirium frequently being present. From about the third to the fifth day jaundice appears and is accompanied by enlargement of the spleen and liver and tenderness over the latter organ. The urine contains albumin and perhaps blood. Disturbances of the digestive system are marked, there being furred tongue, vomiting, and abdominal pain. The temperature falls about the twelfth day and the jaundice begins to fade about the same time. Convalescence is slow, and leaves the patient weak and exhausted. The death rate is relatively high, and has been estimated in one epidemic even as high as 45 per cent. The *Leptospira icterohaemorrhagiae* can be isolated and identified microscopically in a centrifuged deposit of the blood taken about the third day of the disease, in a similar deposit of the urine in the later stages, or by animal inoculation with the same material and subsequent recovery of the organism from the liver and spleen. The above are the

usual symptoms that occur, but some variation in type and severity has been noticed in several of the epidemics described.

Infective Hepatic Jaundice.—Hurst and Simpson (1934) showed conclusively that this type differed from the closely allied epidemic catarrhal jaundice. Several epidemics are classified under this heading by Barber (1937), particularly those recorded by Montford (1934) in Leicestershire and Richards (1933) in Derbyshire. The clinical picture is quite distinct from that in either Weil's disease or epidemic catarrhal jaundice. Usually there are no pre-icteric symptoms of any kind. Pale faeces and dark urine occur immediately prior to the appearance of jaundice, which is accompanied by headache, general malaise, occasional vomiting, diarrhoea, and a slight rise in temperature. The liver and spleen are enlarged though epigastric tenderness is absent. The jaundice is less marked but of longer duration than that of epidemic catarrhal jaundice. Convalescence is prolonged and the patient is left very weak. The mortality rate, though low, is higher than that in epidemic catarrhal jaundice. Appropriate tests disclose an hepatic insufficiency, and in the few post-mortem examinations described hepatic necrosis was present.

Simple Catarrhal Jaundice.—Usually of a very mild character and due to a mechanical obstruction of the biliary passages; said to be due to colds, chills, etc., and often occurs in children. The symptoms of this type and of epidemic catarrhal jaundice are very similar, and it if often difficult to differentiate between the two. Owing to the absence of bile the stools in simple catarrhal jaundice are pale and remain so until obstruction to the bile flow is removed. In the epidemic type, although the stools are for the most part pale, an occasional bile-stained stool is passed.

Enteric Group.—Jaundice rarely occurs in this group of fevers, and although the symptoms resemble in some respects those in epidemic jaundice the agglutination tests and bacteriological examination of the excreta reveal the presence of the organisms belonging to this group.

Acute Yellow Atrophy of the Liver.—Of very rare occurrence, particularly in children. The post-mortem findings are somewhat similar to those in infective hepatic jaundice.

Treatment

All the cases which occurred in this epidemic were under the care of the local general practitioners, and treatment chiefly consisted of confinement to bed for a few days and the relief of symptoms.

It was not considered desirable or necessary to close any of the schools involved. Those children who had been in contact with the disease, also the senior children from the affected villages attending central schools, were, however, excluded for several weeks, and it was impressed upon the parents of the former to keep them in strict isolation during the period away from school. The parents of children who had contracted the disease were advised to prevent them mixing with other children until convalescence was complete.

Summary and Conclusions

1. The recent occurrence of jaundice in Leicestershire as detailed above was undoubtedly an outbreak of epidemic catarrhal jaundice and was very similar to the epidemic in the Midlands described by Morgan and Brown (1927).

2. School children principally were affected, and it is estimated that they comprised from 60 to 70 per cent. of the total number of cases.

3. There was no evidence that the disease was spread through the medium of water or milk supplies, or by rats.

4. It is evident that epidemic catarrhal jaundice is spread by close personal contact, probably by means of droplet infection.

5. The incubation period is about four weeks, and children with the disease appear to be infective during this stage.

6. No causal organism was found, though undoubtedly it exists, probably in the form of a virus as suggested in previous epidemics.

I am indebted to Dr. J. A. Fairer, county medical officer of health, for permission to publish the particulars of this investigation.

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EXTERNAL VERSION FOR BREECH PRESENTATIONS *

BY

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Compared with vertex presentations the incidence of breech presentations is low but the foetal mortality is high. Pierson (1923), Westman (1931), Dearnley (1931), Studdiford (1932), Geothals (1936), and Williams (1924) placed the incidence of breech deliveries between 2.3 and 3.7 per cent. Kedar Nath Das (1926) placed it at 3.3 per cent., and the latest report of the Wadia Hospital (1935) at Bombay gave it as 3.1 per cent. Ryder (1923), Pierson (1923), King and Gladden (1929), Gibberd (1931) Studdiford (1932), Morton (1932), Donovan (1933), Cannell and Dodek (1934), Gordon, Garlick, and Oginz (1934), Barney (1934), Geothals (1936), and St. Mary's Hospital report for 1935 record the foetal mortality as varying from 8 to 26 per cent.; in complicated and premature breech presentations it was as high as 43 per cent. and 48.6 per cent.

Scope of Investigation

Desiring to find out the state of affairs at the Bhagat Hospital for Women and at my private hospital I have reviewed 5,028 deliveries—3,028 from my private hospital and 2,000 from the Bhagat Hospital.

In the first 1,240 deliveries at my hospital and 2,000 at the Bhagat Hospital all cases of breech presentation diagnosed during pregnancy were allowed to continue as such: these are reviewed as Group I. The next 1,788 consecutive cases at my hospital were treated by external version whenever a breech presentation was diagnosed during pregnancy; these represent Group II. All emergency breech cases and those undergoing breech delivery

* Abridged version of a paper read before the Bombay Obstetric and Gynaecological Society.

as a therapeutic measure for complications such as placenta praevia are excluded from both the groups, and only those who were under observation for some weeks before labour are considered.

Breech Presentations in 5,028 Deliveries.

	Group I	Group II	Group II	
			Untreated	External Version Performed
Total number of deliveries...	3,240	1,788	—	—
Breech cases diagnosed antenatally		110	55	55
Primiparae		13	5	8
Multiparae		97	50	47
Breech deliveries	88 (2.7 %)	11 (0.6 %)	9	2
Primiparae	21	3	2	1
Multiparae	67	8	7	1
Cases delivered as vertex ...	—	99	46	53
External version performed	—	55	—	55
Mature babies born	53	94	43	51
Average weight	6 lb. 3 oz.	—	—	—
Stillbirths	6	1	1	—
Deaths	1	—	—	—
Foetal mortality	7 (13.2 %)	1 (1 %)	1	—
Premature babies born ...	35 (39.6 %)	16 (14.5 %)	12	4 (7.3 %)
Average weight	3 lb. 8½ oz.	—	—	—
Stillbirths	16	3	3	—
Deaths	10	1	1	—
Foetal mortality	26 (74.3 %)	4 (25 %)	4	—
Total foetal mortality ...	33 (37.5 %)	5 (4.5 %)	5 {4 breech, 1 vertex}	—
Stillborn	22	4	4	—
Died	11	1	1	—
Average weight of stillborn and dead	4 lb. 10 oz.	3 lb. 14¾ oz.	—	—
Foetal mortality in primiparae	7 (33.3 %)	2 (15.4 %)	2	—
Stillborn	5	2	2	—
Deaths...	2	—	—	—
Foetal mortality in multiparae	26 (38.8 %)	3 (3 %)	3	—
Stillborn	17	2	2	—
Deaths...	9	1	1	—
Average age of primiparae	19.6 years	18.1 years	—	—
Average external pelvic measurements in primiparae				
Interspinous	21.4 cm.	20.1 cm.	—	—
Intercristal	23.4 cm.	22.4 cm.	—	—
External conjugate ...	17.0 cm.	17.6 cm.	—	—

The average weight of the children born in the two hospitals was 5 lb. 15½ oz.; the incidence of breech presentations in the whole series was 1.9 per cent.

Untreated Cases

In the first group of 3,240 deliveries in which breech presentations were not interfered with during pregnancy eighty-eight women were confined as breech deliveries, giving an incidence of 2.7 per cent., and the foetal mortality in these cases was 37.5 per cent.; twenty-two infants were stillborn and eleven died during the first ten days of the puerperium. The standard for deciding prematurity was not based on the gestation period counted from the first day of the last menstruation, because this was found to be very unreliable. A foetus weighing 5 lb. and over was taken as mature and one below 5 lb. as premature. This proved more satisfactory. The average weight of the children at the two hospitals under review has been 5 lb. 15½ oz.

On this standard we found fifty-three mature and thirty-five (39.6 per cent.) premature infants after breech delivery in Group I, with the average weight of 6 lb. 3 oz. and 3 lb. 8½ oz. respectively. Foetal mortality in the mature was 13.2 per cent. and in the premature 74.3 per cent. The average weight of the dead was 4 lb. 10 oz. Of the eighty-eight breech presentations in the group twenty-one were in primiparae, with a foetal mortality of 33.3 per cent. and sixty-seven in multiparae, with a foetal mortality of 38.8 per cent. Among the primiparae seventeen (81 per cent.) were mature and four (19 per cent.) were premature; three of the mature were stillborn, and two stillbirths and two deaths occurred in the premature children. The average weight of the dead in the mature was 6 lb. 8¼ oz., while in the premature infants it was 3 lb. 8½ oz. The average age of the primiparae was 19.65 years. The average external pelvic measurements were: interspinous 21.4 cm., intercristal 23.4 cm., and external conjugate 17 cm.

Of the sixty-seven children born of multiparae thirty-six were mature and thirty-one (46.3 per cent.) premature, with an average weight of 6 lb. 2 oz. and 3 lb. 8 oz. respectively. The foetal mortality was 11 per cent. in the mature and 71 per cent. in the premature. The average weight in the dead was 3 lb. 7 oz. There were seventeen stillbirths, and nine infants died during the first ten days after birth; three stillbirths and one death occurred in the mature and fourteen stillbirths and eight deaths in the premature.

Foetal Mortality

The heavy foetal mortality in breech presentations has always worried obstetricians. In endeavouring to reduce it various factors have been blamed and a number of suggestions made. Gentleness, patience, episiotomy, sacral anaesthesia, preliminary ironing of the vagina, forceps for the after-coming head, and many other suggestions have been made by different writers. In spite of all this the lowest figure for the foetal mortality in breech presentations has remained higher than that in vertex presentations.

In Cleveland Maternity Hospital Barney (1934) found a foetal mortality of 18.9 per cent. in breech cases, excluding prematurity. Hirst and Williams have advised external version, as have Ryder (1923), King and Gladden (1929), Wilson (1930), Gibberd (1931), Studdiford (1932), Dearnley (1931), Donovan (1933), Cannell and Dodek (1934), Munro Kerr (1933), and Aleck Bourne (1933). In the last 1,788 consecutive deliveries at my hospital all cases of breech presentation diagnosed during the later months of pregnancy were carefully kept under observation. The practice at the hospital has been to register the patients for confinements about twelve weeks before term, and they are made to report frequently for observation. A breech presentation was diagnosed in 110 cases, but only eleven of them became breech deliveries—that is, 0.6 per cent. It was a coincidence that in exactly fifty-five cases the breech either turned to vertex naturally while under observation or confined as breech before it was decided to perform external version. The remaining fifty-five cases were treated by external version during pregnancy.

Results of External Version

The total number of breech deliveries in Group II was eleven: nine among the non-treated and only two in the treated cases. The foetal mortality in the series of 110 cases was five (4.54 per cent.) and all the deaths were in the non-treated cases. Of the five four were stillborn and one died during the first ten days. The average weight of the dead was 3 lb. 14¾ oz. There was no mortality in the cases treated by external version. The foetal mor-

tality of 37.5 per cent. in Group I should be compared with that of 4.54 per cent. in Group II, with no mortality in the cases treated by external version.

Prematurity

The number of premature infants in this group was sixteen, of which twelve were in the non-treated group. This represents 14.5 per cent. as compared with 39.6 per cent. in Group I. What is the reason for such a fall in the number of premature labours? Is it due to the improvement of the general health of the patients as a result of ante-natal care, or is it that the breech presentation has a tendency to bring on premature labour? If the latter hypothesis can stand critical examination then the belief that prematurity is an aetiological factor in breech presentation will need to be reconsidered. It was frequently noticed that patients with the foetus lying in the breech position complained of vague pains in the abdomen and were more uncomfortable than those with the foetus lying normally in the vertex position. Is it possible that the breech position irritates the uterus in some way, and if this is the case is such irritation likely to initiate uterine contractions prematurely?

Among the non-treated cases of this group forty-six were confined as vertex presentations and nine as breech. Of the five deaths in the children there were three in the breech deliveries and two in the vertex. Of the fifty-five cases in which external version was performed forty-seven were multiparae and eight were primiparae. Version was successful in fifty-three and failed in two. There were fifty-one mature and only four premature infants. The number of premature births was thus one-fourth of those found in the non-treated cases and far below that of Group I. There was no foetal mortality among these treated cases. Of the two failed cases one was a primipara 17 years old, who came under observation only five days before delivery with the breech fixed in the pelvis; external version, though tried, could not be performed. The second case was a multipara diagnosed as a breech presentation on September 21; external version was tried on October 1. She did not report again, and came to the hospital in labour on October 16: a female child weighing 4½ lb. was delivered by the breech.

Many foetuses diagnosed as breech presentations during pregnancy turn to a vertex position before term; just as many do not turn naturally. This is seen from the comparison of the results of the two groups reviewed. The incidence in Group I was 2.7 per cent., while in Group II it was 0.6 per cent. Thus 2.1 per cent. failed to turn.

When to Perform Version

When should the external version be performed? The cases came under observation usually between the twenty-eighth and thirty-second weeks of pregnancy, the usual practice being to register them for confinement after the seventh month was completed. During the first four weeks of observation the patient was usually left alone. After that if the breech presentation persisted external version was performed. Only in a very small number of cases did the foetus revert to the breech position after version. A second attempt was made in these cases, and proved to be successful, except in the two cases described. Thus the time when external version was performed extended from the thirty-third week to very near term, usually between the thirty-third and thirty-sixth weeks.

I found that it was easy to perform version during those weeks, though later it became more and more difficult. In cases which reverted to the breech position it was not difficult to perform version again. Anaesthesia was never found necessary in the series reported. It might be required and might be of help if the operation was postponed to the later weeks. Most authors are in favour of turning the child during the thirty-fourth or thirty-fifth weeks. Aleck Bourne (1933) and others advised it at the thirty-sixth week. Two weeks earlier than this has, to my mind, an advantage in the ease with which manipulations can be carried out, particularly in primiparae.

Possible Dangers

The early onset of labour and separation of the placenta and consequent ante-partum haemorrhage have been mentioned as possible dangers of version. Ryder (1923) had one case of bleeding per vaginam and premature labour, but with no untoward consequence. Wrigley (1934), criticizing ante-natal work, observed that in two London obstetric hospitals where external version was performed under anaesthesia the manipulations had caused rupture of membranes in some cases, and in one the cord prolapsed, while in three there was brisk ante-partum haemorrhage. Foetal deaths were caused by asphyxia owing to detachment of the placenta and constriction of the umbilical cord as a direct result of a somewhat violent effort to turn the baby. He observed that external cephalic version under anaesthesia must be regarded as a manipulation that was not free from danger and must not be performed with any force. McCullagh (1933), besides the complications already mentioned, suggested a possible danger of rupture of the uterus at the time of labour subsequent to the version, particularly in breech with extended legs. He collected four cases of this kind from the literature, and therefore advised *x*-ray examinations before and after version, concluding that if the child presented by head and feet it should be turned again and delivered by the breech.

Aleck Bourne (1933) maintained that the risks of version were counterbalanced by greater safety to the woman and far greater safety to the child. Munro Kerr (1933) advised that all breech presentations should be corrected to vertex. Studdiford (1932) believed that the operation of version was harmless, but quoted Ehrenfest's statement that anaesthesia was dangerous. Ryder (1923) was enthusiastic about the good results of external version. He pointed out that by doing an external version one was able to judge the size of the pelvis; anaesthesia was risky, as undue force might be applied.

In our cases no anaesthesia was used; in one patient in whom anaesthesia might have been of use the presentation was allowed to continue as a breech. If version is performed early and not delayed till after the thirty-sixth week anaesthesia should not be necessary. The foetus, being above the pelvis, turns easily without any undue force. Even cases with extended legs would not present difficulties if version was practised in the earlier weeks, though cases with extended legs noticed during the last weeks would not be easy to turn; *x* rays would be of help in such instances.

TECHNIQUE

The patient was advised to take a light opening medicine overnight, and she was called next morning at about 9 o'clock; after she had passed urine she was put on the operation table. The head of the table was lowered a little, but a pillow was kept under her head. She was asked to flex her thighs about 30 degrees by drawing the legs up; this procedure gave good relaxation of the abdominal muscles. The abdomen was well powdered and the position of the foetus ascertained after assuring the patient that the manipulations would not give

her pain. She was asked to go on taking gradual deep breaths followed by complete expiration. This allowed the operator's fingers good access down into the pelvic cavity. The breech was taken out of the pelvis and into the superior strait. Once this was accomplished the rest was not difficult. The breech was pushed out and up towards the back of the foetus and the head in and down towards the child's abdomen. A few movements like this were necessary to get the head into the iliac fossa. Then the patient was asked to turn a little to the side opposite to that in which the back of the foetus was lying. When this was done the head was pushed inwards and downwards and the breech lifted upwards. The head was felt passing over the brim into the pelvic inlet. The dorsal position was then resumed and the head was gripped between the fingers and pushed down into the pelvic cavity. This last manœuvre gave us an idea of the size of the pelvis. Once the head was in the pelvis the version was complete. Occasionally it was necessary to push the breech towards the child's abdomen and the head towards its back, the child turning by anti-clockwise movement. Pushing out the breech from the pelvic cavity by the help of fingers introduced in the vagina was also occasionally required. No binder or any other appliance was found necessary to maintain the vertex position.

The patient was asked to report two days later, and was kept under observation subsequently. If at any later visit reversal to a breech position was noticed another attempt at cephalic version was made. More than two attempts were never found necessary, and that, too, in a very small number of cases. We did not meet with any untoward complications due to the manipulations.

I cannot conclude without expressing my thanks to my house-surgeons Drs. Jhavery and Shah.

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A special tour in Central Europe has been arranged for May 23 to June 10 in connexion with the meeting at Bucarest of the Permanent Committee of the International Congress of Military Medicine and Pharmacy. Leaving Paris on May 23 at 10.15 p.m. the places to be visited include Venice, Dubrovnik, Cettigne, Serajevo, Belgrade, Turnu-Severin, and seven days in Bucarest. The fee of £61 10s. covers all travel expenses from Paris to Bucarest and back with second-class rail travel with Wagons-lits and first-class passages on river boats and various excursions on the way. An alternative return journey through Budapest and Vienna, extending over June 10 to 16, can be made for £7. For further details and for booking application should be made to Gellatly, Hankey and Co., Ltd., 62, Pall Mall, London, S.W.1, or at the offices of this firm in Manchester, Liverpool, or Glasgow.

A NEW STABILIZER FOR SCHICK TOXIN

BY

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AND

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The improvement in methods of making dilutions of diphtheria toxin used in the Schick test has steadily increased their stability during the past sixteen years, and now such dilutions remain unaltered for at least six to twelve months, or more, at room temperature. We have retested many batches that have been returned to us from such distant places as Bombay, Shanghai, Capetown, the Federated Malay States, and the Argentine. These dilutions have travelled by ordinary post or by air mail, and have always been of full strength when tested on their return. Recent papers, however, have shown that the present dilutions produce allergic reactions in a very small percentage of subjects. H. J. Parish (1936) summarizes fourteen such cases, including one with very severe reactions attributed to peptone, reported by G. Bousfield (1936). The possibility of producing with Schick toxin a severe allergic response to peptone has induced us to find another stabilizing agent free from this disadvantage. We propose for the purpose human serum.

Experimental Work

The strength of Schick toxin dilutions has been measured quantitatively at the Wellcome Physiological Research Laboratories by the determination of the minimal reacting dose in guinea-pigs and by titration against antitoxin (Glenny and O'Brien, 1921). Stability has been judged by tests made after exposure to higher temperatures than would be encountered during normal storage. As improvements have been made so we have increased the temperature by different stages from 30° C. to 45° C. Results of this rapid test for deterioration have always been confirmed by subsequent tests on material left for long periods at room temperature. In his pioneer work in this country on diphtheria immunization Dr. R. A. O'Brien used for the Schick test dilutions in saline containing 0.5 per cent. phenol, the common U.S.A. diluent. Such dilutions remained stable for a week at 15° C. but retained only 5 to 15 per cent. their original strength after twenty-four hours at 35° C. A few seconds' shaking in partially filled bottles caused total destruction (Glenny *et al.*, 1925). Experimental work showed that a buffer solution increased the stability of toxin dilutions, and although a phosphate buffer was more suitable to use at the optimum *p*H for stability, a boric borate buffer (Glenny *et al.*, 1928) of slightly higher *p*H was chosen for its bacteriostatic properties. Some batches of toxin diluted to Schick strength in buffer were more stable than others, remaining at full strength for fourteen weeks at room temperature, whereas others were only stable for four weeks. Weaker toxins needing less dilution were more stable than stronger toxins. Assuming that increased stability was due to a higher broth content, the next step was to increase the amount of broth in the dilution to 0.5 per cent. Such dilutions remained stable for six months at room temperature. Bunney (1931) suggested the use of 2 per cent. peptone. Experiments at these laboratories showed that 0.1 per cent. Witte peptone in borate buffer solution was sufficient to stabilize Schick toxin so that it would remain of full potency for twelve months or more at room temperature.

We have chosen human serum as the stabilizer which is least likely to cause allergic reactions or to act as a sensitizer in human subjects. It is necessary to choose serum which does not contain enough antitoxin to interfere with the balance between the toxicity and combining power (antitoxin binding power) of the toxin. We have used serum containing no detectable antitoxin (that is, less than 0.0005 unit per c.cm.). The stability of Schick dilutions containing various amounts of human serum and of peptone is given in the table.

Diluent	Number of Days' Exposure to 45° C. (Percentages of the Original Strength)					
	1	2	3	7	14	28
Boric borate buffer containing:						
1 in 1,000 Witte peptone	85	80	70	55	30	20
1 in 1,000 human serum	<40	20	—	0	—	—
1 in 500 „ „ ...	75	60	45	25	10 or less	0
1 in 200 „ „ ...	70	70	45	40	20 or less	0
1 in 100 „ „ ...	90	80	55	45	30	10

Experience of all former diluents has shown that any material losing less than 40 per cent. of its potency after twenty-four hours at 45° C. remains stable for at least six months at room temperature. We consider that 1 in 500 human serum will remain stable (that is, at least 80 per cent. of its original strength) for six months at room temperature. This is sufficient for all practical purposes, and although the toxin could be further stabilized by increasing the serum content to 1 in 100 this would involve the use of unnecessarily large amounts of human serum.

Summary

Dilutions of diphtheria toxin for use in the Schick test need a stabilizer.

Peptone has been used for this purpose, but has been reported to cause allergic reactions.

Human serum is shown by animal experiments to be a suitable substitute.

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According to K. Jaroschka (*Zbl. Gynäk.*, January 9, 1937, p. 82) it is unwise in abdominal removal of large submucous myomata to attach too great importance to the preservation of the faculty of parturition. Numerous cases of uneventful spontaneous labour after myomectomy have been reported—for example, after enucleation of nine myomata during pregnancy, and after a conservative myoma operation in which the amnion was pierced by the sutures and liquor amnii subsequently discharged for twenty-four hours. Nevertheless, serious dangers to both mother and foetus may attend labour in the myomectomized uterus. In illustration Jaroschka records the case of a patient aged 39 who conceived eight months after abdominal removal of eight myomata (some being submucous): going into labour in the ninth lunar month she had Caesarean section done on account of uterine inertia, the os being fully dilated. Operation showed that portions of the placenta were attached to two cicatricial areas (the sites of operative incisions) which were devoid of musculature. Delivery by the vaginal route would certainly have been attended by complete rupture of the uterus in the third if not the second stage of labour, for manual removal of the placenta would have been required.

Clinical Memoranda

Migration and Excretion of a Foreign Body

This unusual case is of interest because it demonstrates how Nature can occasionally deal with a situation in which surgery is powerless.

On September 24, 1936, a man aged 40 years, wishing to commit suicide, shot himself in the chest with a revolver. The bullet entered the left sixth intercostal space half an inch outside the left mid-clavicular line. A skiagram showed a foreign body lying in the midline and just anterior to the tenth thoracic vertebra.

The patient developed pneumonia, with a temperature of 102°. It was decided not to operate on account of the inaccessibility of the bullet and in view of the patient's poor general condition. Moreover, he had undergone a gastro-enterostomy only two months before admission. Comment was made upon the fact that the bullet, although injuring the left lung, had apparently missed such vital structures as the heart and the larger blood vessels.

Thirteen days later, in the course of defaecation, the patient passed a foreign body in the stools. It was a bullet half an inch in length. A subsequent skiagram showed no evidence of a foreign body, and the patient made a complete recovery.

Similar cases are rare. However, Evans (1931) reports the migration of a 5-cm. piece of metal from the abdominal wall. Operation for its removal was unsuccessful, and it was recovered from the stools four days later. He emphasizes the importance of taking a skiagram immediately before any attempt at removal, with special consideration to the migrating tendencies of foreign bodies.

For permission to record this case I wish to thank Dr. Edward Miles, medical superintendent of Oldchurch Hospital, Romford.

Romford. ANDERSON GARLAND, M.D., D.P.H.

REFERENCE

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Temporary Post-traumatic Total Blindness

The following unusual case may be of interest. A man aged 22 was admitted to this hospital recently. His history was as follows:

CASE RECORD

2.30 p.m.—He received a slight kick in the right frontal region while playing Rugby football. He felt dazed for a short time, but continued playing.

3.15 p.m.—He remembered picking up the ball and kicking it, and then he immediately became totally blind. He could not remember any second head injury, and was at no time unconscious.

5.15 p.m.—He was brought to the hospital, conscious, apparently feeling well and with no headache, but totally blind in the right eye, and with perception of light just returning in the left eye. The fundi showed marked swelling of the inner edge of both disks, especially the right; no retinal haemorrhage or exudate. Power, sensation, and reflexes were normal.

6 p.m.—He complained of slight right frontal headache. A small swelling, half-inch by half-inch, was developing on the right side of the forehead one inch above the orbit.

6.45 p.m.—He could distinguish objects at less than three feet in the left eye, and could just appreciate light in the right eye. The papilloedema was very marked in the right eye, but unchanged in the left. He also complained for a short time of uncontrollable flickering of the right eyelid.

8 p.m.—Distant vision was returning to the left eye and light was now easily seen by the right eye. Papilloedema was diminished in the left eye, but increased in the right eye. The field of vision in the left eye, by rough tests, was complete.

One Day Later.—Vision was almost normal in the left eye; indistinct at more than four feet in the right eye. The papilloedema was much decreased, being seen on the inner side of each disk only. The swelling on the forehead had subsided, and there was no discoloration there.

Two Days Later.—Visual acuity was normal in both eyes; fields of vision were complete. The inner edges of the disks were still blurred. A skiagram of the orbit revealed no fracture.

Twelve Days Later.—He had frontal pain on looking up; pupils were wide and reacted normally. Examination of the fundi showed in the right eye a trace of papilloedema but no pulsation of the vessels; the blind spot was increased by a quarter diameter. In the left eye there was slight papilloedema with marked venous pulsation; the blind spot was increased by two diameters.

It would appear that this man must have had a slight local haemorrhage immediately in front of the optic chiasma, and affecting, at first, the right optic nerve more than the left. Unfortunately, no lumbar puncture could be done on the night he arrived.

I am very much indebted to Dr. Horatio Matthews, consulting ophthalmic surgeon to the hospital, for his advice and his permission to publish this case.

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A Physical Sign in Perinephric Abscess

It is notorious that perinephric abscess is often missed till, in a patient worn out and wasted with fever, a large collection in the loin demands attention. The reason is that in many, probably most, cases urinary signs and symptoms are absent, and so examination is not directed specifically to this area. If the condition is borne in mind diagnosis can be made at an early stage by means of the following test:

The patient is placed prone and quite straight, and attention focused on the angle between the last rib and the erector spinae. Inspection may detect a slight fullness on one side, but even before this change is visible palpation will reveal an increase in muscle tone. On the sound side the fingers can be dipped deeply in towards the kidney, and on the other there is a demonstrable difficulty in doing so. There may be present to the examining fingers the sense of a deeply placed mass, but this represents a relatively late stage of the disease. Tenderness is sometimes present. It is surprisingly inconspicuous.

Guarding of the muscles in the loin is not, of course, confined to cases of perinephric abscess. It may be seen, for instance, after injury to the spine, in osteo-arthritis of the spine, and in perinephric infiltrations of other types, such as haemorrhage. These are all as a rule easy to exclude. Pyonephrosis may give rise to some difficulty, but the enlarged kidney is usually palpable and recognizable as such, and it is possible to eliminate this lesion, if there be serious doubt, by routine urological methods.

Operation in a case diagnosed thus early shows the kidney sheath rigid and pale in colour. When it is opened pus may be found at once, but if not the finger swept round the kidney will soon locate it.

In the second edition of Mr. Hamilton Bailey's valuable book, *Physical Signs in Clinical Surgery*, reference is made to examination of these cases in the sitting posture. I believe that if the patient is prone diagnosis will be made even earlier and more certainly. In this position the muscles in the loin are completely relaxed upon the normal side. And, further, the kidney tends to fall away from the examining finger, thus accentuating the difference between the normal and what is found when we are dealing with a rigid and adherent kidney sheath, as in cases of perinephric abscess.

Liverpool. JOHN T. MORRISON, F.R.C.S.

Reviews

PSYCHOTHERAPY AND CONDUCT

Mind, Medicine and Metaphysics. The Philosophy of a Physician. By William Brown, D.M., D.Sc., F.R.C.P. (Pp. 294. 7s. 6d. net.) London: H. Milford, Oxford University Press. 1936.

A series of addresses and essays by Dr. William Brown now collected under the title "Mind, Medicine and Metaphysics" forms a volume which will be of great interest to many people, including medical practitioners. The importance of psychology to medicine in all varieties of practice has now become recognized, even officially; and Dr. Brown reminds us in his preface that metaphysics was defined by William James as "an unusually obstinate effort to think clearly," and that metaphysics, as the asking of ultimate questions about the nature of reality, cannot be avoided any more than the speaking of prose. No more suggestive volume than this, for those who of necessity know a little of psychology and have a desire to think clearly about its practical application to medicine and its bearing upon fundamental ideas of philosophy, can well be imagined. Since the successive chapters were addressed to various audiences, medical and lay, in varied circumstances, there are in the book a good many repetitions of certain facts, arguments, and theories, but this is no disadvantage, because, though the author's thought is consistent and coherent from beginning to end, the volume need not be read through as a consecutive whole. The first three chapters are those which will be of most direct interest to medical readers so far as actual practice is concerned. They deal with psychotherapy in its relation to the miraculous, to physical treatment, and to psychoanalysis. Other chapters deal with sex control, mediumistic trance, character and personality, intermatrimonial relations, moral obligation and free will, religion, and the group movement—all, of course, from the point of view of psychology.

As is well known the views of Dr. William Brown on the nature and value of religion differ radically from those held by Freud, and he expounds and illustrates these views very clearly and effectively in the present volume. The survival of personality is another subject of general interest on which he has an excellent chapter. One of the chief merits of the book is the clearness with which the author makes and demonstrates certain distinctions, differences, and relations which are not always apprehended even by fairly instructed readers. As such may be instanced the relation between the method of suggestion and that of mental analysis, between functional and organic disease, between will and imagination, between moral and psychological factors in conduct; and the essential differences between hypnosis and sleep, between confession and analysis, between repression and self-control. Dr. William Brown emphasizes, too, the value of mental analysis in enhancing the normal as well as in remedying the abnormal, and the extent to which health depends upon self-understanding and a right outlook and appreciation of the values of existence. From the point of view alike of medicine and of metaphysics this is an important and revealing book.

DEVELOPMENT OF PHTHISIS IN ADULTS

Die Entwicklung der Lungentuberkulose des Erwachsenen. By Wilhelm Kremer. (Pp. 38; 55 figures. R.M. 3.60.) Leipzig: Georg Thieme. 1936.

It is pointed out in the preface that the publication of this small book by Dr. Wilhelm Kremer was prompted by the

discovery during post-graduate teaching that there existed among practising physicians much vagueness about the development of pulmonary tuberculosis in adult life. The compilation of the brochure was made possible by the opportunity given to the author of obtaining a large number of serial skiagrams over a period of several years at a convalescent institution extensively used by the members of a large insurance society. Although Dr. Kremer states that a great many adolescents and adults develop pulmonary tuberculosis as the result of a primary infection during adolescence, not more than 60 per cent. of persons being infected at the age of 15 even in large towns, he bases his description of the development of phthisis on the three-stage theory of Ranke. Thus adult phthisis generally arises directly or indirectly from the pulmonary residua of the general dissemination constituting Ranke's second stage; even when the primary infection occurs in adolescence the sequence of events is similar, the corresponding intervals being shortened. Dr. Kremer admits, however, than an infiltration may arise without any obvious connexion with an old lesion, though here, too, it is possible that the latter exists but is not detected radiologically because of its small size or peculiar situation. In sixteen excellent diagrams are depicted the various results which may follow primary infection, including its progress to phthisis in the adult. Serial radiographs, well reproduced, serve to illustrate the stage of generalization, its sequelae, and the development of the adult lesion.

This little volume can be recommended to clinical workers in tuberculosis who wish to obtain a clear picture of the conception that phthisis is the final episode of an infection in childhood.

THE EXTERNAL EYE MUSCLES

The Extra-Ocular Muscles. A Clinical Study of Normal and Abnormal Ocular Motility. By Luther C. Peter, A.M., M.D., Sc.D. Second edition. (Pp. 351; 136 figures. 21s. net.) London: H. Kimpton. 1936.

Inevitably the greatest changes in the new edition of this book are to be found in the chapter on concomitant squint. A new part on operative technique makes its appearance, while throughout the text stress is laid upon the more precise use of terminology. Thus "duction" is limited to mean movement of the eye against prisms, instead of the wider significance generally attached to the word. As an attempt at a comprehensive review of this branch of ophthalmology Dr. Peter's monograph stands alone among recent publications. Generally it departs but little from the accepted teaching, though to English readers a good deal may appear of small practical importance. The sections on cyclophoria indicate that more attention is paid in the United States to this anomaly than in this country. Here and there Dr. Peter's views strike a distinctly personal note. Not many ophthalmologists would agree that it is impossible to get very young children to wear glasses; 16 months is rather a high minimum age. The use of high-frequency currents in squint is a tantalizing subject, on which the author's remarks leave more unsaid than said.

The extra-ocular muscles are perhaps dealt with in too slipshod a fashion by most clinicians, and a rather full monograph is therefore welcome. None the less, the book is not as satisfying as one could wish. Though a largish volume, it is far from comprehensive, the subject-matter being on the whole elementary. Dicta and personal experience cannot very well replace material evidence in a systematic monograph, and the occasional references seem to be on no definite plan—references to classical contributions jostling cheek by jowl with recent publications of no particular significance. Nor do a diffuse style and cross-references make for readability. The nomenclature in the book, whatever scientific merit it may have, is distinctly confusing, and the ten-page section on nystagmus presents many linguistic puzzles. What, for instance, could an English reader devoid of German make of "endstellung nystagmus" not further defined, or of the "Brunner's Dreschirm"? The author's weakness for fusing Latin words will not commend itself to everyone when such monstrosities as "corticofugal" and "infrageniculate" make their appearance, to say nothing of such barbarisms as *ex anopsia* spelt as if it were one word.

More care in proof-reading would have avoided such misprints as "synstagmus" (p. 339) and references to such non-existent bodies as the British National Research Council. The second edition represents a considerable expansion of the first. Should a third edition be called for it is the reviewer's hope that the book will have undergone a slimming course; at a third of its present bulk it would not be marasmic.

A BIOCHEMICAL TEXTBOOK

Principles of Biochemistry. By Albert P. Mathews. (Pp. 512. 20s.) London: Baillière, Tindall and Cox. 1936.

Professor Mathews, like the authors of other textbooks of biochemistry, has been faced with many problems. In his *Principles of Biochemistry* he has done his best to overcome them, and has been to a great extent successful. In the first place, he has had to bring his book as far as may be up to date, in face of the bewildering rapidity with which new work makes its appearance. The experimental work proceeding in almost every civilized country is such that not only are fresh details of the subject coming to light almost from week to week, but observations are being made which change fundamentally our outlook at many important points. The discovery of the role of the anterior pituitary in carbohydrate metabolism is changing our conception of diabetes; the distinction between hormones, vitamins, and enzymes grows less and less sharp as one after another of these substances is isolated as a pure product and its chemical constitution studied; our conception of the nature of nervous function may be fundamentally altered as evidence accumulates supporting the "humoral theory" of nervous activity.

Not only must the author of a biochemical textbook be aware of all these rapid changes in, and additions to, existing knowledge, but, if he writes for students, he must make up his mind how much of it is suitable for teaching purposes; for it is clear both that a limit must be set to the amount which a student can be expected to learn in his pre-clinical years, and, further, that that limit has nearly been reached in the present curriculum. It is easy to say that the student should be told whatever facts are important to the general understanding of his subject and are established on an adequate experimental basis. It is less easy for the author to apply these criteria, and it is certain that his colleagues will disagree with some at least of his decisions. Our own feeling is that Professor Mathews sometimes errs on the side of liberality in this respect. He emphasizes the value of imagination, but imagination in science finds its place more in the planning of experiments than in the interpretation of their results, and though no doubt Professor Mathews understands the distinction, the student is only too apt to lose sight of it.

The book contains an account of much new work, which is represented in a clear and interesting manner. Whether the chemical constitution of the carbohydrates deserves quite as much space as the author has given to it is a matter of opinion. It is possible that biochemistry may develop more rapidly in the future on the dynamic and biological side. If this should prove to be the case some method will have to be found of presenting to the student the fundamental chemical conceptions which it involves, without loading him too heavily with chemical detail.

INTRANASAL IONIZATION FOR HAY FEVER

Hay Fever. With Special Reference to Treatment by Intranasal Ionization. By Clive Shields, B.M., B.Ch. (Pp. 57; illustrated. 7s. 6d. net.) London: H. Milford, Oxford University Press. 1937.

This book adequately fulfils its function of giving practitioners and students a detailed description of the author's technique of intranasal ionization in the treatment of hay fever. It contains a historical account of the aetiology of the disease which is excellent in every way. The description of the symptomatology and differential diagnosis will also be found interesting and helpful. There is an account of the anatomy and physiology of the nose and accessory sinuses, and of the action of various drugs and their component parts on the mucosa; this, too, is admirable, and as it is illustrated by photomicrographs it will carry conviction.

Some of the author's generalizations may be taken, however, *cum grano salis*, because he appears to regard any other method than his own as being useless. For instance, the results of previous desensitizing injections in a series of his patients are given as 82 per cent. no relief, 18 per cent. slight relief, and none great relief, whereas the results of his own form of treatment are given as "complete relief, or 90 per cent. relief, in 93 per cent. of cases." This seems to the impartial observer a rather high average. The last chapter gives a clear and concise account of the technique of the author's method of treatment, and from this point of view Dr. Shields's book is of interest; it is not, however, an unbiased contribution to the literature of hay fever.

This volume is excellently produced and printed, and is of interest as giving an understandable account of one particular form of treatment of hay fever.

MENTAL DISORDER IN TIMES PAST

Historical Notes on Psychiatry. (Early Times—End of 16th Century.) By J. A. Whitwell, M.B. (Pp. 252; 10s. 6d.) London: H. K. Lewis and Co. 1936.

Dr. J. R. Whitwell, well known as the honorary librarian of the Royal Medico-Psychological Association, and formerly medical superintendent of St. Audrey's Hospital, Melton, Suffolk, writes a curiously interesting book. The title is too modest for the contents, which discuss in the light of modern knowledge the various forms of mental disease which have afflicted men from the earliest times to the end of the sixteenth century. Dr. Whitwell shows himself to be a man of very wide reading and an excellent scholar. He groups his notes into instances taken from the Bible, from the Talmud, from the Koran, from the classics, and from mediaeval literature. The mental states of Saul, David, Nebuchadnezzar, St. Paul, Hector, Achilles, Ajax, Cambyses, and many others come under consideration, and are placed in their proper classification. The views of Pythagoras, Plato, and Aristotle are considered, and extracts are given from many of the classical medical writers from Hippocrates and Avicenna to Felix Plater (1536–1614), the acute clinical observer who was among the first to look for a pathological basis of mental disorder.

The book is full of odd information. The reader will learn that fifty-one names have been given to epilepsy; he will learn much about the Nightmare, and will be able to answer the question, "What is acedia?" which was long numbered fourth amongst the seven deadly sins. Of the lodestone he is told: "This hath a discerning faculty of a woman that is chaste and of her that plays the adultress, for if any do set it secretly upon ye bed of ye chaste woman she, being overborne with sleep, both opens her hands towards her husband and cleaves close to him, but the other being troubled with dreams with foul labours falls out of bed." The latter part of the book contains a series of extracts and translations from many early writers on mental diseases which will prove a mine of information for those less skilled in the classics than is Dr. Whitwell. The last section contains some valuable chronological data.

Notes on Books

Dr. A. G. AULD'S book, *The Nature and Treatment of Asthma, Hay Fever, and Migraine* (H. K. Lewis and Co., Ltd., 12s. 6d.), includes a selection from the author's clinical investigations, which have been largely occupied by the subject of allergy. With the exception of one chapter all the material published in this volume has appeared in the columns of the *Lancet* or the *British Medical Journal*. The opening item is a lecture on asthma, given at the North-East London Post-Graduate College in 1908, and the final item is a case-history dated 1885.

Dr. ISRAEL BRAM, medical director of the Bram Institute for the Treatment of Goiter and Other Diseases of the Ductless Glands, has in *Exophthalmic Goiter and its Medical Treatment* (Kimpton, 25s.) brought out what is a nominal second edition of a work published in 1920, but the text has been so completely revised and enlarged that this is really a new book. It is based on an experience of more than five thousand cases during a quarter of a century, and concentrates on the success of medical, psychotherapeutic, and hygienic measures. The author draws a sharp distinction between toxic adenoma, which he regards as primarily a local condition and amenable to surgery, and Graves's disease, which is a constitutional state and does not respond in a satisfactory manner to "mere thyroid ablation." Dr. R. G. Hoskins of the Harvard Medical School in a brief and cautious foreword makes the best of this appeal against thyroidectomy, and remarks that "habitual reliance upon surgery as the therapy of choice may lead to a mental scotomatosis." It must be freely admitted that the thyroid may be secondarily and not primarily affected in Graves's disease, but on the other hand, from a practical point of view, the available evidence points to thyroidectomy as the most successful form of treatment. The author, who has obviously taken much trouble not only in the collection of his matter but in the manner of its presentation, describes about twenty-four different types of Graves's disease, and the "Bram quinine test" for hyperthyroidism—namely, tolerance to 30 to 90 grains of quinine daily for several weeks.

Dietetics for the Clinician, by Dr. MILTON A. BRIDGES of New York, which was reviewed in our issue of August 18, 1934, has now reached its third edition (Kimpton, 45s.). In preparation for this new edition the author has made an extensive survey of the literature on diet therapy, and has rewritten much of his text in the light of recent knowledge of foods and their nutritive, vitamin, and mineral constituents.

THE RECENT EPIDEMIC OF INFLUENZA IN GERMANY

[FROM A MEDICAL CORRESPONDENT IN BERLIN]

In Germany, as in England, influenza is not a notifiable disease, but the data published by the Reichsgesundheitsamt respecting new cases of influenza and pneumonia reported to the sixteen largest krankenkassen of the Reich give an instructive picture of the course of the epidemic. Table I sets out the figures down to the end of February received by four departments.

It will be seen from Table I that the course of events was different in the different cities. In Berlin the maximum was reached in the week ending December 5; in Breslau, to the south-east, at the beginning of January. Frankfurt, on the west, had its maximum in the same week as Berlin, as did Hamburg. Frankfurt recorded a higher maximum than the other three cities here tabulated, but this was exceeded by Königsberg in East Prussia, which returned a rate of 27.8 per 10,000 for the week ending December 19, and by Brunswick, with a rate of 25.5. It is pointed out in the *Reichgesundheitsblatt* (1937, Nr. 4) that the eastern and southern parts of the Reich tended to be affected later. This is illustrated by Breslau and Stuttgart. In Munich there was a peak on December 14 and a second maximum on January 4.

TABLE I.—*New Cases of Influenza and Pneumonia among Insured Persons*

In the table the figures and rates shown within parentheses relate to notifications of pneumonia. The numbers of insured are shown in thousands, after the name of each city.

Period	Berlin (845.4)		Breslau (119.4)		Frankfurt-am-Main (143.2)		Hamburg (221.8)	
	Notifications	Per 10 000 Insured Per Diem	Notifications	Per 10.000 Insured Per Diem	Notifications	Per 10,000 Insured Per Diem	Notifications	Per 10.000 Insured Per Diem
22.11.36—28.11.36	3,784 (119)	6.4 (0.20)	108 (—)	1.2 (—)	1,389 (7)	12.8 (0.07)	1,018 (1)	6.5 (0.01)
29.11.36—5.12.36	8,147 (136)	13.8 (0.23)	123 (—)	1.4 (—)	1,898 (6)	18.9 (0.06)	1,624 (1)	10.3 (0.01)
6.12.36—12.12.36	5,604 (82)	9.5 (0.14)	143 (1)	1.7 (0.01)	—	—	1,618 (7)	10.3 (0.04)
13.12.36—19.12.36	3,502 (501)	5.9 (0.85)	287 (10)	3.4 (0.12)	1,364 (2)	13.5 (0.02)	1,140 (22)	7.3 (0.14)
20.12.36—26.12.36	—	—	313 (7)	5.1 (0.11)	736 (2)	7.4 (0.02)	516 (7)	4.6 (0.03)
27.12.36—2.1.37	1,703 (47)	2.9 (0.08)	781 (12)	12.8 (0.20)	645 (6)	6.5 (0.06)	461 (2)	4.1 (0.02)
3.1.37—9.1.37	2,071 (504)	3.5 (0.95)	1,347 (11)	16.1 (0.13)	784 (8)	7.9 (0.08)	692 (10)	4.4 (0.06)
10.1.37—16.1.37	1,860 (54)	3.1 (0.09)	881 (9)	10.5 (0.11)	669 (—)	6.8 (—)	469 (14)	3.0 (0.09)
17.1.37—23.1.37	1,729 (66)	2.9 (0.11)	591 (7)	7.1 (0.08)	535 (1)	5.4 (0.01)	456 (12)	2.9 (0.08)
24.1.37—30.1.37	1,784 (87)	3.0 (0.15)	462 (10)	5.5 (0.12)	435 (4)	4.3 (0.04)	432 (8)	2.8 (0.05)
31.1.37—6.2.37	1,587 (73)	2.7 (0.12)	365 (3)	4.3 (0.04)	548 (1)	5.5 (0.01)	351 (6)	2.3 (0.04)
7.2.37—13.2.37	1,314 (79)	2.2 (0.13)	301 (7)	3.5 (0.08)	329 (6)	3.3 (0.06)	284 (7)	1.8 (0.04)
14.2.37—20.2.37	1,160 (75)	2.0 (0.13)	245 (5)	2.9 (0.06)	358 (1)	3.5 (0.01)	237 (6)	1.5 (0.04)
21.2.37—27.2.37	1,019 (65)	1.7 (0.11)	209 (5)	2.5 (0.06)	295 (3)	2.9 (0.03)	197 (3)	1.2 (0.02)

Returns of deaths ascribed to influenza and pneumonia are available for all cities with populations of 100,000 or more and are shown in Table II.

TABLE II

Week	Deaths from	
	Influenza	Pneumonia
25/10/36—31/10/36	30	285
1/11/36—7/11/36	40	290
8/11/36—14/11/36	57	280
15/11/36—21/11/36	114	328
22/11/36—28/11/36	138	362
29/11/36—5/12/36	356	527
6/12/36—12/12/36	484	709
13/12/36—19/12/36	535	747
20/12/36—26/12/36	512	591
27/12/36—2/1/37	433	637
3/1/37—9/1/37	379	598
10/1/37—16/1/37	269	455
17/1/37—23/1/37	237	440
24/1/37—30/1/37	171	428
31/1/37—6/2/37	190	476
7/2/37—13/2/37	132	561
14/2/37—20/2/37	117	449
21/2/37—27/2/37	115	440

Having regard to the close and uninterrupted communication between such cities as Berlin, Breslau, Hamburg, and Frankfurt these differences in the course of the epidemic must be referred to local, perhaps meteorological, factors.

The mortality figures of Table II show the accustomed parallelism between mortality from influenza and pneumonia, although, as we should expect, the movement of the influenza record is more striking. Although a serious epidemiological event the epidemic in Germany, as in England, has been less serious than on some other occasions since the pandemic of 1918–19, and of course trivial in comparison with the pandemic itself.

W. A. Brown and V. D. Allison (*J. Hyg.*, Camb., January, 1937, p. 1) found that the air of four large scarlet fever wards contained haemolytic streptococci, all but 6.5 per cent. of which could be classified into nine serological types—namely, 1, 2, 4, 5, 8, 9, 11, 23, and 25—the prevalent epidemic types 2 and 4 forming 81.6 per cent. of the total. The degree of infection of the air with haemolytic streptococci showed considerable variation during the twenty-four hours. During the night infection was absent or negligible, while in the morning there was a steep rise followed by a slight fall in the degree of infection during the early afternoon, the variation being probably due to the degree of air movement produced by the ward staff. Haemolytic streptococci were widespread in the ward air, and the serological types identified were not confined to the neighbourhood of patients infected with a particular type.

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MALARIA IN EUROPE

There have been few changes so remarkable in our outlook upon any disease as those which have followed as a result of the discovery by Ross of the mosquito cycle in malaria. Not the least remarkable of these changed conceptions are those arising out of recent researches and discoveries connected with the natural history of malaria and its prevention in Europe. It is no surprise, therefore, to those familiar with this recent work to find Dr. Hackett giving an account of the most up-to-date advances in malariology under the title of *Malaria in Europe*.[1] This book, published under the terms of the bequest, is a presentation of materials gathered for the Heath Clark Lectures given by the author during December, 1934, at the London School of Hygiene and Tropical Medicine. Prior to the war little importance was attached to the fact that malaria, so important in the Tropics, also occurred in a number of countries in Europe. Endemic malaria in the modern epidemiological sense was scarcely recognized as existing. Dr. Hackett's book opens with an appreciation of what is now understood by this term, "the great complex and organized exchange of gametocytes and sporozoites which we now call endemic malaria." Endemic malaria in Europe is likened to "a great lake, which a century ago was inundating all Europe, but which after the middle of last century was found to be gradually draining away by unknown channels, unaccountably subsiding to lower levels, abandoning first the cold north and then becoming shallow over great zones of Europe, finally revealing islands irregularly distributed here and there, but remaining in deep pools, which were the permanent centres of the more extensive endemic range of the disease."

The causes underlying this "silent almost unnoticed" withdrawal of malaria from Europe, which has had nothing to do with any conscious activities or efforts of man to bring it about, has long been the subject of conjecture. Better housing, improved economic conditions, and many other reasons have been put forward to explain it, but in large part at least it is now known to have depended upon quite unsuspected facts in the natural history of malaria itself. The basal and underlying causes are related to the fact that the carrier species of anopheles in Europe, *A. maculipennis*, is not, as was thought until recently, a single biological unit, but consists of some four or five subspecies, or even distinct species, so similar in appearance that they can only be identified with certainty, even by the entomologist, through differences in their eggs. But while in appearance so similar each of these subspecies possesses small peculiarities in habits and behaviour which have in so remarkable a manner fitted in with human affairs and influenced transmission that many of the major epidemiological features of malaria in Europe are to be explained on this basis. Under normal circumstances a female anopheles, through development of its ovaries and the necessity for oviposition, must every few days leave the house or stable where she has had her blood meal in order to deposit her eggs. When she returns for the purpose of feeding again she usually does not enter the same feeding place. The result of this is a sort of general post, the places where the insects are found resting during the day being no certain indication of where they have actually obtained their blood meal. With any particular race or species it depends upon the conditions and the anopheles's own predilections under these conditions how far their blood meals are obtained from man or cattle respectively, and hence how far the species by feeding more than once on man, with the necessary interval for the development of sporozoites, is likely to be an effective agent in the transmission of malaria. It for this reason that the "precipitin index" or percentage found under any given conditions to have made their last blood meal on man is now the most reliable index to the association of a species with malaria and its status as a carrier.

Thus the old idea of a species having a fixed value as a carrier has now become largely modified. In Holland and some other parts of Europe still existing malaria is associated with *atroparvus* and the forms *messeae* and *typicus* play no part. But these usually harmless forms can nevertheless act as carriers under different circumstances, as they do in some parts of Europe or at special times when the conditions under which the inhabitants are living are such as to favour this. The conditions determining the presence of endemic malaria in Europe are largely bound up with agriculture. Primitive agriculture is usually associated with malaria. With the rotation of crops comes the necessity to maintain cattle to feed on the fodder crops, and stall feeding tends to replace pasture feeding. With "stabulation" there come the optimum conditions for the "deviation" of any species of zoophilic habits, and if these zoophilic

[1] *Malaria in Europe. An Ecological Study.* By L. W. Hackett, M.D. London: H. Milford, Oxford University Press. (10s.)

forms alone are present, as is the case over a large part of Europe, malaria disappears, though anopheles are still abundant. In the carrying out of preventive measures the correct "appraisement of the malaria situation" becomes of great importance. In the presence of an inveterate human feeding species such as *labranchiae* or *elutus* Dr. Hackett maintains that no improvements in agriculture, housing, or social status are likely to be effective, and the species must be attacked in its breeding places or, if this is impracticable, all human dwellings must be screened. But with *atroparvus*, and still more so when malaria is associated only with *messeae* or *typicus*, preventive measures aiming at deviation are more appropriate. Such "species sanitation" does not only apply to Europe, and much work has been done recently in the Tropics in the way of tracking down the inveterate human feeder and devising methods for its elimination.

All such recent ideas on carrier species and many other matters of great interest in connexion with malaria, such as the part played by the parasite itself and the role of immunity in man as well as the nature of attack methods, are dealt with in Dr. Hackett's book. This is by far the most informed, readable, and up to date popularized account of the malaria situation as we now know it that has come to our knowledge. Dr. Hackett himself is one of the chief pioneers in these fields.

LEGISLATION FOR THE DEAF

The demand for a Deaf Persons Act is cogently set forth in the annual report of the National Institute for the Deaf. Proposals for such legislation have the practically unanimous support of all organizations which make this section of the community their special care. Save for the education of children in special schools almost everything that has hitherto been done to help the deaf has been carried through by voluntary effort, but voluntary effort cannot fully cope with the economic side of the problem, and the co-operation of the State is becoming more and more necessary. The county and county borough councils were asked some time ago by the Ministry of Health to exercise their powers under the Poor Law Act, 1930, to make grants to the local societies for the deaf and dumb in order that these might act as employment agencies for their members. The response, however, has been disappointing. Reasonably adequate grants have been made in but a few areas, insufficient grants in the majority, and in some areas none at all. The friends of the deaf feel that the State should become responsible for the deaf as it is already for the blind. There are in this country 40,000 persons who are "deaf-born"—that is, who were deaf before speech could develop—and an unnamed number who have become deaf through disease or accident later in life. It seems obvious that the settlement of these people in employment should be a State concern. Voluntary effort can find plenty of exercise in devising measures to mitigate their loneliness and draw them into the social circle.

The latest report (the first to be issued from the new headquarters of the National Institute at 105, Gower Street, London, which was opened in June last by our present King, then Duke of York) shows how much kindly help is available for the deaf through local societies and regional associations. The National Institute itself does a surprising amount of good work on an annual expenditure, insufficiently met by income, of under £2,000. It is to be hoped that a Deaf Persons Act may before long find its way on to the Statute Book. One of its provisions, the Institute considers, should be the lowering of the compulsory school-beginning age of deaf children from seven to five years. This has been advocated by teachers of the deaf for a generation, and is known to have the sympathy of the present Minister of Education. A second provision which is urged is the extension of State assistance, where necessary, for all cases of disabling deafness, irrespective of its origin or the age of the sufferer. Again, about 400 deaf and dumb children leave the special schools at the age of 16 each year, and the task of finding suitable employment for them is one of obvious difficulty. It is suggested that the obligation be laid on county and county borough councils to train deaf adolescents as well as to retrain in suitable occupations those who, because of their affliction, cannot follow their normal calling. At present the regional associations for the deaf, of which there are six covering England and Scotland, act as intermediaries between the local societies for the deaf and the schools, but it can be argued with a great deal of force that the responsibility for the preparation for industry of these school-leavers should fall on the community as a whole.

The committee of the National Institute is now sponsoring a piece of research into the most suitable occupations for the deaf. This is being directed from the department of industrial physiology of the London School of Hygiene, and it is hoped that as a result suggestions may be made to large employers whereby, through an appropriate transference of members of their staffs as between departments, some of the unemployment now so often the result of acquired deafness may be prevented. Yet another provision which might aptly fit into the

measure would be the earlier granting of old age pensions to deaf persons who by reason of sickness or other infirmity can no longer be employed. Among those who have started life with so heavy a disability there will always be a number whose capacity for work ceases at an earlier age than the normal. Finally, it is advocated as a part of the measure that there should be set up an advisory committee on the deaf for the consideration of matters referred to it by the Ministry of Health and other departments and for bringing matters on its own initiative to the attention of the Government.

IMMUNIZATION AGAINST DIPHTHERIA

The results of epidemiological surveys of comparable groups of Baltimore children in respect of diphtheria morbidity and carrier prevalence and of antitoxic immunity as estimated by the Schick reaction, during the two periods 1921–4 and 1933–6 have recently been published by W. H. Frost[1] and others.[2] The individuals investigated in each survey were alike in respect of environment, season of the year, and age distribution; such differences as existed were so slight that adjustment did not alter the figures significantly. So far as possible a uniform bacteriological technique was followed, but the use of highly selective media, particularly of the tellurite–cystine–blood-agar in the later years, led to an appreciable and increasing proportion of successful attempts at isolation of *C. diphtheriae* where whole-culture virulence tests were negative—4.5 per cent. against 1 per cent. in the earlier years. The suggestion that whole-culture virulence tests may be safely employed as a substitute for the more elaborate procedure of isolation in pure culture is hardly borne out by the later findings. When due allowance is made for the discrepancies in the bacteriological results it is seen that during the period between each survey the prevalence of *C. diphtheriae* fell for the season November to March inclusive from 2.44 to 1.08 per cent. The difference in the numbers examined, 3,319 and 3,288 respectively, is large enough to place them well beyond the range of probable sampling variation but insufficient to permit of precise measurement. In the earlier survey the carrier-frequency was higher in the 5–9 years age group than in the 10–14 years group; the figures for November and December were slightly in excess of those for February and March but not enough to be of statistical significance, while in the 1934–6 survey the carrier-frequency was generally so low that but little importance could be attached to the small differences that were observed. Comparative observations on negroes and white children revealed no significant difference in the 1921–2 survey, and the numbers of the former under observation in the later survey were too meagre for adequate comparison. The period of accelerated decline in carrier-frequency corresponded fairly closely to the time when artificial immunization on a large scale was being carried out in Baltimore, although the numbers actually immunized were relatively small in comparison with the observed lowering of morbidity. The Schick-positive rate among white children of the age-group 5–14 years in 1921–2, before artificial immunization was introduced, was compared with the rate recorded in 1933–4, by which time immunization had been carried out on a restricted scale for some eight years and on a large scale for five years; the proportion was seen to have fallen from 49.4 per cent. to 32.3 per cent.—that is, a ratio of 1 to 0.65—the reduction remaining fairly constant in the separate age groups. Among unimmunized subjects the proportion of Schick-positive reactors was approximately the same in both surveys, 45 per cent. Following the diminished incidence in identified carriers a decline in the amount of natural immunization might have been expected but for the fact that all save the youngest children have been heavily exposed to infection before 1928, when the marked reduction in morbidity was first observed. Since just over 50 per cent. of the children had received artificial immunization and the Schick-positive rate fell by no more than 35 per cent. the efficiency of immunization as determined by the Schick-negative state is rather less than 70 per cent. This low rate is attributed partly to the long interval—five to ten years—between immunization and retest, when a proportion of relapses may reasonably be expected, and partly to the fact that not all had had the complete course of inoculations. The data presented here do not support the assumption that liability to infection is less among Schick-negative reactors than among non-immunes, but they do show that over a given period the former group is less liable to diphtheria. On the other hand, only a proportion, generally small, of positive reactors who become infected with *C. diphtheriae* suffer clinical attack; in 1921–4 the proportion observed to contract the disease was several times greater than it was in 1933–6. The authors believe that artificial immunization is the main factor in reducing diphtheria morbidity; the other two important factors which may influence morbidity—namely, diminished infection-frequency and a lowered ratio of attacks to infections—are held not to be related directly to artificial immunization. Moreover, they consider that changes in the dispersibility and virulence of the causative organism or alterations in host resistance not necessarily specific in character, or a combination of these factors, are more likely to be responsible for the decline in morbidity than altered environmental conditions such as improved hygiene and housing or reduction in the size of families.

Further information on artificial immunization and morbidity of diphtheria is given in a comprehensive report issued by the United States Public Health Services, which describes a survey of 130 localities situated in eighteen different States between 1928 and 1931. It was ascertained that immunization had been afforded to 43 per cent. of all children under 9 years of age, but that at older ages the rate declined progressively until in the 20–24 years age group there was a history of immunization in only 5 per cent. During the same period 7 per cent. in this group gave a history

[1] *Amer. J. Hyg.*, November, 1936, p. 568.
[2] *Publ. Hlth. Rep.*, Wash., December 18, 1936, p. 1736.

of clinical attack. In the course of twelve months 3.05 per cent. of the children under 15 years were artificially immunized; the measure was applied just as frequently in rural areas as in the towns, but the incidence of the disease was, as is usual, much higher in the latter. The immunization rate was seen to rise in correspondence with increase in the family income so far as the pre-school child was concerned, but at later ages no consistent relation between immunization and income was observed. The amount of artificial immunization and the incidence of diphtheria in particular localities are detailed, but no clear-cut epidemiological conclusions emerge; this may be attributable in part to differences in the intensity and scope of the immunization campaigns sponsored by the various public health authorities.

PERIARTERITIS NODOSA

Since the recognition, in 1866, by Kussmaul and Maier of periarteritis nodosa a spate of literature has not thrown much light on the aetiology of the condition. McCallum[1] states that it "is essentially an infective process which produces changes in the media and intima of small arteries with cell exudation and hyalinization followed by more extensive leucocytic infiltration of the adventitia and immediately adjacent tissue." Harris and Friedrichs believe that the disease is caused by a filterable virus. In a recent account of seventeen cases observed personally, Rose Spiegel[2] reports that the disease was often preceded, within two months of its first manifestation, by an infection: tonsillitis, sinusitis, or scarlet fever occurred in seven out of the seventeen cases. Klotz, by injecting streptococci or serum into rats highly sensitized against streptococci, claims to have produced similar lesions in these animals. The suggestion is put forward that periarteritis nodosa is an allergic phenomenon: "allergy" thus adds another disease to its list. The injury to the vessel wall leads to the formation of aneurysms, to thrombosis, and to haemorrhage. The occurrence of purpura suggests that the capillaries are also affected. The course of the disease may be acute, subacute, or chronic, and the result is in most cases fatal, although recoveries have been recorded. It appears at any age and is commoner in males. In Rose Spiegel's series cardiac lesions were found in all the fatal cases—that is, in fifteen out of seventeen. The coronary arteries were frequently involved; pericardial haemorrhage from rupture of the vessels occurred twice and auricular necrosis once. Aschoff bodies were found in four cases and pericarditis in six. Hypertension was present in just over half the patients. Pulmonary arterial lesions were found in five, although symptoms of pulmonary disease were rare, the commonest being pleural pain. Renal lesions were found in the fifteen fatal cases: renal infarction, glomerulonephritis (due presumably to the cause of the disease rather than to gross vascular lesions), and other changes consequent on the arterial lesion. Several of the patients died in uraemia: one patient had a gross haematuria from rupture of a diseased renal vessel, and a second died of renal haemorrhage. Vascular lesions were responsible for scattered ulcerations in the intestinal tract and haemorrhagic pancreatitis occurred in three cases. The skin lesions were various: tender, reddened or slightly scaly nodules, purpuric spots, and urticaria. A condition which was apparently a reaction to the cause of the disease rather than a result of the vascular changes was polyserositis, involving the pericardium, the pleura, or the peritoneum.

[1] *Textbook of Pathology*, 1936. W. B. Saunders Company.
[2] *Arch. intern. Med.*, 1936, **58**, 993.

THYROID THERAPY IN CRETINISM

It is common experience that whereas the physical development of cretinous infants is almost invariably benefited by the administration of thyroid, the effects of therapy on the mental state are much less certain. Tredgold has suggested that there are in fact two types of cretin: one in which the mental and physical retardation are both due to hypothyroidism, and one in which a primary amentia is complicated by hypothyroidism. In spite of the recognition of such discrepancies in thyroid therapy and of the enormous literature on cretinism (thirty years ago 2,468 titles were listed), a recent publication from the Clinic of Child Development and the Department of Pediatrics, Yale University School of Medicine is said to be the first detailed objective study of the effect of thyroxine on early mental growth. The authors, Drs. A. Gesell, C. T. Amatruda, and C. S. Culotta,[1] have investigated six cases of cretinism or hypothyroidism in which the condition had been recognized and adequately treated in infancy, and have included for comparison a normal infant and an adult male cretin untreated in infancy. The mental findings were formulated quantitatively, using the Yale norms of infant development. The methods of studying and recording mental progress were largely those which the senior author has already made familiar: extensive cinematograph films were made for permanent record and comparison. The appearance and disappearance of cretinoid signs and symptoms were charted in individual cases over the period of study. It was found that of the six children investigated two remained mentally defective and four reached a fair degree of normality. On the other hand, all six patients, who before treatment showed no pronounced variation from the physical picture of cretinism, lost the cretinous facies and habitus. In giving a prognosis of mental development the authors point out that those patients did best who reacted best to small doses of the dried gland and were intolerant of larger doses, whereas those in whom mental development was unfavourable did not display this intolerance and were only slightly benefited by large doses. Although the age at which therapy is begun and the severity of retardation are generally regarded as of great importance in prognosis, no close association was found between these two factors and the response of the patients to treatment. A more significant point was found to be the promptness of reaction to treatment, those in whom physical and mental response was most quickly manifest being those whose ultimate development was most satisfactory on both counts. It

[1] *Amer. J. Dis. Child.*, 1936, **52**, 1117.

was particularly obvious in studying physical development that the original degree of dwarfing was unimportant if a ready increase in height took place when therapy was instituted. The results of treatment over the whole period make it clear that the first two years of treatment were of critical importance, that the entire gain in developmental quotient was accomplished during that time, and that the maximum quotient once reached could be maintained indefinitely on thyroid treatment. Although generalizations cannot be founded with confidence on six cases, the authors have clearly made a contribution of real clinical value if only in indicating a line for further study, and have properly emphasized the importance of a knowledge of behaviour patterns in infancy in the advance of paediatrics.

PREVENTION OF TUBERCULOSIS

King George VI has consented to become Patron, and H.R.H. the Duke of Kent President, of the National Association for the Prevention of Tuberculosis. It was in 1898 that King Edward VII, as Prince of Wales, founded the Association and became its first President. On his accession to the throne he became Patron, and was followed by King George V and King Edward VIII. The Duke of Kent succeeds the Prince of Wales as President. The National Association for the Prevention of Tuberculosis has led and unified voluntary effort against tuberculosis in this country for thirty-nine years, instructing public opinion and stimulating public interest in the means of prevention and cure. Its annual conferences are held alternately in London and other centres ; it also initiates special inquiries for the study of vital problems. The chairman is Sir Robert Philip, who fifty years ago established in Edinburgh the first tuberculosis dispensary in the world. This year's conference will take place from July 1 to 3 in Bristol ; the chief subjects for discussion being propaganda and publicity methods ; preventive institutions, with particular reference to open-air schools ; and equipment and activities of a tuberculosis dispensary. The names of delegates and of private individuals wishing to attend should be sent to the acting secretary-general, N.A.P.T., Tavistock House North, Tavistock Square, W.C.1.

SIZE OF THE PROSTATE

The size, weight, and shape of the prostate vary much. Atrophic glands in the adult may weigh as little as 10 grammes, and the weight of large hypertrophied glands may be as much as 300. The average weight of the normal adult gland has been stated by various authorities to lie between 20 and 25 grammes. A recent study of the prostate by careful dissection of the specimens taken from 100 consecutive necropsies has been made by M. van Buren Teem,[1] working as a Fellow in medicine at the Mayo Foundation at Rochester, Minnesota. The average weight in Teem's series accorded closely with the normal values of 20 to 25 grammes. As the prostates studied had not been a factor in the cause of death, the series did not contain many hypertrophied glands. It was found that in adults atrophic glands (those weighing, for example, 10 grammes, which is the normal weight in a boy aged 12) are usually associated with atrophic testes, such as are seen in association with hypopituitarism. An interesting point elicited was the fact that a large prostate may be symptomless: for instance, one prostate weighed 139 grammes, yet it came from a subject in whom there had been no history of significant genito-urinary symptoms and in whom at the necropsy there was no evidence of urethral obstruction. It would appear that urethral obstruction depends more upon the manner of the enlargement than upon its degree. The author points out that as the prostate enlarges it changes from a rather flattened chestnut shape to one which is more spherical, and the chief dimensional alteration is in the antero-posterior measurement or depth of the organ. He has prepared tables by which the weight of the gland may be calculated from its measurement ; if the antero-posterior, side-to-side, and vertical measurements expressed in centimetres are multiplied together and by a factor 0.666 the weight of the gland is obtained with a reasonable degree of accurary. This formula may prove useful in the post-mortem room, since the requisite measurements can be readily made without dissecting out and weighing the gland.

[1] *Arch. Pathol.*, 1936, No. 6, 22, 817.

ADVISORY COMMITTEE ON NUTRITION

The first report of the Ministry of Health's Advisory Committee on Nutrition is published to-day (H.M. Stationery Office, 1s. net). The reference to the committee was " to inquire into the facts, quantitative and qualitative, in relation to the diet of the people, and to report as to any changes therein which appear desirable in the light of modern advances in the knowledge of nutrition." The chairman is Lord Luke, and the medical members are Dr. G. F. Buchan, Professor E. P. Cathcart, Dr. J. Alison Glover, Dr. J. M. Hamill, Sir F. Gowland Hopkins, Dr. Donald Hunter, Professor E. Mellanby, Sir John Boyd Orr. The late Mrs. Chalmers Watson, M.D., was an original member of the committee, and Dr. T. W. Wade was added soon after its appointment in May, 1935. The present report gives the results of a preliminary survey of the whole field. The committee is very far from having completed its investigations, and in several directions has initiated large-scale inquiries, which are only just beginning. Its purpose now is to outline the nature of the problems and the general picture it has formed of the present position. The report is a document of over 50 pages that does not lend itself to brief summarization, and we must therefore defer our descriptive account of it to a later issue, merely noting meanwhile the emphasis laid, in Part VI, on the nutritive value of milk and milk products. " From the health standpoint there is no other single measure which would do more to improve the health, development, and resistance to disease of the rising generation than a largely increased consumption of safe milk, especially by mothers, children, and adolescents. . . . We deplore the fact that there is a deficiency of milk in the diet of large sections of the population."

ENDOCRINES IN THEORY AND PRACTICE

This article is one of a series on Endocrinology contributed by invitation

THE HORMONE TREATMENT OF SOME DISORDERS OF PREGNANCY

BY

T. N. A. JEFFCOATE, M.D., F.R.C.S.Ed.

PART II

Missed Abortion, Carneous Mole, and Intra-uterine Death of the Foetus

These interesting conditions are essentially the same in so far as the ovum or foetus dies but remains *in utero* because the normal stimulus to uterine action is lacking. Oftentimes evacuation of the uterus eventually takes place spontaneously, but occasionally weeks or months elapse without there being any sign of the onset of expulsive uterine contractions. In such cases artificial evacuation of the uterus is indicated, and it is for this purpose that oestrogenic hormone is useful. The ordinary medicinal induction generally fails because the uterus is not sufficiently sensitive to respond. The continued administration of oestrogenic hormone, however, increases uterine activity to such an extent that even if evacuation does not take place spontaneously the uterine contents are at once expelled when oxytocic drugs are given. The following technique is successful in at least 80 per cent. of cases.

Oestradiol benzoate, 40,000 international benzoate units (200,000 international units), should be injected intramuscularly every eight hours for eight days (unless evacuation takes place before the elapse of that time). On the fifth day quinine and pituitary induction, using the technique outlined previously, should be carried out. The administration of oestrus-producing hormone should be continued throughout, and if the first attempt at medicinal induction fails the quinine and pituitary should be repeated as before on the eighth or ninth day. Only on the rare occasions when the uterus fails to respond to this treatment is it necessary to institute operative measures. In actual practice the oestrogenic hormone frequently brings about the desired result without further uterine stimulants being necessary: this is especially true if the pregnancy is far advanced and the foetus has been dead for a relatively short period of time. This form of treatment is of no value for "incomplete abortion"; in this condition the residual fragments of placenta or membranes are usually adherent to the uterine wall.

It is at first sight rather remarkable that hormonic evacuation of the uterus is rendered possible by the death and retention of the foetus. It is, however, now known that in these cases the amount of oestrin in the blood is considerably reduced, or, alternatively, is present in a "combined" and inactive state. So characteristic is this feature that if less than 1 mouse unit of active oestrogenic substance is demonstrable in 40 c.cm. of blood the diagnosis of foetal death can be made. This test is more reliable than radiological or clinical investigation.

The rationale of treatment is therefore clear: the administration of preparations having oestrogenic properties remedies a pre-existing deficiency in the blood stream.

Excessive Vomiting and Toxaemia of Pregnancy

For many years past one of the theories of the aetiology of hyperemesis gravidarum has depended upon a supposed defective function on the part of the corpus luteum, and acting on this supposition many clinicians have prescribed corpus luteum tablets for this distressing complaint. The impotence of such tablets, from the hormonic standpoint, has already been emphasized. Since the theory on which the treatment is based has never been substantiated by pathological evidence the administration of even standardized preparations of progestin is not recommended as a means of controlling pernicious vomiting.

It has recently been suggested that in cases of pregnancy toxaemia there is a relatively excessive amount of prolan and a deficiency of oestrin in the urine. In view of this the administration of oestrogenic hormone for toxaemia of pregnancy is already advocated in commercial literature. The evidence upon which this view of the pathogenesis of toxaemia is based is flimsy and unconvincing, and this form of organotherapy is not advised.

Uterine Inertia

USE OF OESTROGENIC HORMONES

Since the activity of a uterus is primarily dependent on the effect of oestrin many cases of uterine inertia in labour are probably due to a defective supply of this hormone. This suggestion is conjectural, since it has never been confirmed or disproved by hormonic estimations. The deficiency in oestrogenic factors is not necessarily absolute but may be relative; in other words they may be present, but in an inactive state, in the blood stream. This theory has led to a trial of oestrogenic hormone therapy for uterine inertia. Most writers report poor results—on a very small series of cases. In my experience the results are variable, some disappointing and others remarkably good; this is to be expected in view of the numerous and widely different possible causes of defective uterine action. No definite subdivision of cases is yet possible, but it would appear that the results are poor if the inertia is due to emotional influences, local lesions of the uterus, disproportion, or malpresentations. Moreover, the injection of oestrogenic hormone rarely evokes a response in the presence of conditions such as "occipito-posterior position," in which slow dilatation of the cervix and weak contractions in the early stages of labour are beneficial to the patient and the inertia is "physiological" in type.

Primary inertia is more amenable to this treatment than is secondary, and 50 per cent. of all cases of uterine inertia appear to derive some benefit from the administration of oestrogenic substances; in some patients the effect is dramatic. The following technique is advised: 20,000 international benzoate units (or 100,000 international units) of oestrogenic hormone should be injected intramuscularly every hour for at least ten injections, unless the delivery is completed in a shorter space of time. An immediate response is not to be expected, and repeated injections are usually required before any improvement in uterine action is manifested. Occasionally efficient "pains" begin within ten to fifteen minutes after injection, but it has yet to be proved that such a rapid effect is strictly hormonic in origin. It is necessary to empha-

size that this form of therapy is at present on trial only: it has, however, the great advantage of being free from all the dangers that are associated with the administration of other oxytocic substances, and no harm to either mother or child can follow its use. The occasional good results justify its extended employment. Here again hormone therapy should not replace the more established methods of treatment; it should be regarded as additional treatment and should be given when the patient has been rested and refreshed by the use of morphine, which still remains the first and best line of attack in uterine inertia.

From what has been said it is clear that oestrogenic hormone therapy also opens up new possibilities with regard to prophylaxis against inertia. It may prove even more valuable in this respect. When the history of inertia in previous labours, or the detection of an atonic uterus ante-natally, makes the expulsive capacity of a uterus "suspect," 20,000 international benzoate units (100,000 international units) of oestrin should be injected intramuscularly twice daily for two or three weeks before the expected date of delivery.

USE OF POSTERIOR PITUITARY HORMONE

As prophylaxis against inertia 5 units of posterior pituitary should be injected twice daily for two weeks before the expected onset of labour; this treatment is attended with happy results and is devoid of risk. But when labour has started and inertia is established the administration of this hormone requires the utmost caution. The effect of even small doses may be so pronounced that the uterus, cervix, or other soft maternal tissues may be ruptured; moreover, the foetus is likely to die from interference to the placental circulation. Only when the position of the foetus is normal, and when the presence of even mild disproportion is excluded, should the use of posterior pituitary extract be contemplated. Its application is occasionally indicated for patients suffering from accidental ante-partum haemorrhage complicated by defective uterine action. The dose should never exceed 2 units initially, and after its injection the medical attendant should remain with the patient until delivery is complete.

Only rarely is the use of such a powerful oxytocic substance required, and its margin of safety is so small that many obstetricians are coming to regard its employment during labour as unjustified in all circumstances. It is, however, stated that its dangers are somewhat decreased if it is applied intranasally rather than parenterally.

Post-partum Haemorrhage

During the third stage of labour the injection of pituitary extract is dangerous because of its propensity for producing hour-glass contraction of the uterus; it should never be used for third-stage haemorrhage nor to hasten placental separation. But for bleeding occurring *after* delivery of the placenta this hormone is a life-saving principle and its administration should never be neglected. The intragluteal injection of 5 or 10 units is as a rule sufficient, but 2 units intravenously or 5 units into the uterine muscle (via the abdominal wall) exert a more rapid and certain oxytocic effect, and should be given when control of the haemorrhage is difficult or delayed.

Delayed Involution

When, after abortion or labour, involution is slow and the lochia profuse, and particularly if there is reason to suspect the retention of blood clot or small pieces of membrane in the uterus, 5 units of posterior pituitary extract should be injected intramuscularly twice daily for a few days.

Tonic Uterine Contraction

Tonic uterine contraction may involve the whole of the upper segment, as in obstructed labour, or, on the other hand, it may affect a strictly localized area of one or other segment of the uterus and appear in the form of a "contraction ring." These serious obstetrical complications demand the immediate institution of measures designed to relieve spasm and to reduce uterine tone. Morphine and general anaesthesia do not always have the desired effect, and now that it is claimed that progestin, when given in large doses, quickly exercises an inhibitory action upon the human uterus (puerperal), this hormone should be tried in such conditions. So far I have failed to influence the uterine contractions of *normal* parturition with large doses of progestin (20 international units), but this does not necessarily mean that pathological uterine spasm will not respond favourably to such treatment.

Another endocrinous preparation sometimes advised for tonic uterine contraction is 5 minims of adrenaline hydrochloride 1 in 1,000. The internal secretion of the suprarenal has very varied effects on uterine muscle, and whereas in some patients it temporarily suppresses contractions, in others it produces an opposite response. This treatment is therefore of small value.

The Relief of "After-pains"

Uterine contractions during the first week after delivery are, on occasion, so painful as to cause the patient considerable distress. It is reported that 1 rabbit unit of progestin, by inhibiting the uterus, relieves such pain within fifteen minutes in nearly 90 per cent. of cases. It is, moreover, rarely necessary to repeat the injection. I have no personal experience of this use of progestin, and it is extremely doubtful whether it is wise to allay muscle contractions whose purpose is to expel blood clot and necrotic shreds of decidua and membrane from the uterine cavity. Such contractions are essentially protective in character and should be encouraged rather than suppressed; the injection of 0.5 c.cm. of posterior pituitary extract frequently relieves "after-pains," since it replaces irregular uterine spasm by rhythmical strong contractions.

Disorders of Lactation

Although breast development is brought about by oestrogenic and corpus luteum hormones, the secretion of milk can only be effected through the agency of the anterior lobe of the pituitary—by a special hormone designated "prolactin." This hormone has been given to patients in whom the supply of milk was deficient; the dose so far recommended on empirical grounds is 150 bird units, followed by 100 bird units in twelve to twenty-four hours. Although the rationale of this method is sound the reported results are, so far, discordant, and the usefulness of the hormone in this sphere is at present unproved.

The oestrogenic hormone, while stimulating breast development, inhibits the secretion of milk by its action on the pituitary gland. Hence, in patients in whom lactation is not desirable, the discomfort of engorged and painful breasts is theoretically avoidable by injections of oestrogenic hormone. The dose advised is 10,000 international benzoate units (50,000 international units) of oestrogenic hormone on three successive days, beginning as early as possible after delivery. Although good results are reported for this form of organotherapy I have failed to notice beneficial effects with this dosage. Possibly larger amounts of hormone, continued for a longer period and followed eventually by a gradual reduction in the oestrin supply, would be more efficacious; such a technique has a more scientific basis. It is, however, open

to question whether the discomfort of repeated intramuscular injections is preferable to the pain of engorged breasts, especially since the latter is of short duration and may readily be relieved by other well-recognized methods of treatment.

Dangers of Hormone Therapy

So far as is known at present the administration for short periods of time of the largest doses of oestrogenic, corpus luteum, and gonadotropic hormones is free from risk. But posterior pituitary extracts differ from preparations of the other hormones in that they are extremely dangerous unless prescribed with caution. The possibility of the production of ruptured uterus and tonic uterine contraction by means of these agents has already been discussed. In addition, it should be remembered that most extracts contain a vasopressor factor, and their employment is therefore contraindicated in patients suffering from cardiac disease or toxaemia of pregnancy. Cases are recorded in which the onset of eclamptic fits appears to have been due to such preparations. Moreover, some patients show an idiosyncrasy to pituitary extract, and after receiving it may collapse and present the signs of so-called "pituitrin shock." If this occurs in a patient already suffering from loss of blood the issue may be fatal. It is probable that many cases of "obstetric shock" would be more correctly diagnosed "pituitrin shock."

In view of the above disadvantages and dangers many authorities now advise the use of the isolated oxytocic fraction of the posterior pituitary lobe (for example, pitocin, Parke, Davis and Co.) rather than preparations containing both oxytocic and vasopressor factors. Pitocin possesses a further advantage since its administration does not produce a refractory phase in the uterus, whereas injections of extracts such as pituitrin render the uterus incapable of responding to a second application of the same substance until half to one hour has elapsed. Nevertheless pitocin is equally dangerous when given in labour, although it has a less powerful oxytocic action than have the "mixed" extracts of the posterior hypophysis.

Conclusion

The value and limitations of posterior pituitary hormone therapy are clearly defined, but it is difficult to assess the merit of other forms of organotherapy in the obscure functional disorders of gestation. Any experiments or results must of necessity be uncontrolled, and only by the collection of large numbers of cases can an estimate of the worth of any particular method be made. Nevertheless progress is being made, and already hormones are proving of definite clinical value in some of the conditions mentioned. Their use, however, is strictly limited and must always be guided by scientific principles; the prescription of hormones empirically or with a faulty technique merely brings organotherapy into disrepute. Moreover, the therapeutic application of endocrinology is still handicapped by the expense of most preparations and by the lack of accurate knowledge regarding the absorption, utilization, inactivation, destruction, and excretion of the hormones in question.

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SCIENTIFIC RESEARCH IN INDUSTRY

A YEAR'S WORK

The Advisory Council of the Department of Scientific and Industrial Research, of which Lord Rutherford is chairman, directs attention in the Department's annual report (Cmd. 5350, H.M. Stationery Office, 3s.) to important developments in the outlook of industry in this country. The last five years have witnessed "the fruition of the policy adopted by several large industrial undertakings of setting well-balanced teams of research workers, including chemists, physicians, engineers, and, where necessary, biologists, to solve a particular problem to develop a new product." The future, the report continues, no longer lies with industries content to make sporadic advances at the call of the brilliant individualist; co-operation, team work, and an extensive organization on the technical side are essential for success. For this reason the Department attaches great importance to the development of the co-operative research associations formed under the scheme launched in the early days of its existence.

Savings in the Milk Industry

Valuable work is being done by the Department with the co-operation of the Milk Marketing Board on the purification of waste waters and effluents from milk depots, creameries, and condensed milk factories. Two different methods have been worked out and shown to be successful on a large scale, by which the polluting character of milk washings can be reduced by 99 to 97 per cent. respectively. Investigations have also drawn attention to the losses of milk, cream, whey, etc., carried away in the waste waters. It has been shown that the waste from this cause can be reduced by nearly three million gallons a year. At the low wholesale price of 5d. a gallon for milk for manufacturing purposes this means a saving of about £50,000 a year to the industry. Five per cent. of the total quantities of by-products—whey, skimmed milk, etc.—is frequently lost at present in the waste waters. This loss can be reduced to about 2 per cent. The suggestions put forward for reducing these wastes have already been adopted at several factories.

Storage of Food

At the Low Temperature Station, Cambridge, the effect of radiation from radio-active substances in destroying bacteria is being studied in connexion with the storage of meat. Methods of storing eggs in different concentrations of carbon dioxide are being tried out on a large scale: a high concentration of, say, 60 per cent. prevents attack by mould and gives an excellent yolk but a very fluid white. Experiments have been made on the "gas storage" of pears. British pears have been stored in refrigerated chambers with the atmosphere adjusted to contain the correct amount of CO_2 for long periods, extending well into the summer. When removed from the store the flavour, texture, and appearance of the pears were entirely satisfactory. Excellent results under commercial conditions have been obtained by improved methods for the preservation of peas by freezing. Quick cooling and freezing following blanching in hot water are essential, and the colour and flavour of the peas are improved by the addition of just

the right amount (0.1 to 0.15 per cent.) of sodium carbonate. The storage of flour is being studied by the Flour Millers' Research Association. It has been found that during storage the bacteria content diminishes to a small value while the fungi content rises to very high values.

Better-fitting Boots and Shoes

The outstanding development in the work of the Boot and Shoe Research Association has been the start of what is called for brevity "walking research." Most people have suffered from shoes which seemed to fit all right in the shop but after being worn some time have developed uncomfortable creases and folds which pressed on the foot and caused the growth of corns and other troubles. In order to present manufacturers with the means for designing better-fitting shoes the Research Association is making careful records of the way in which people walk. A moving platform or treadmill is used, on which a person can walk without moving away from a particular point. While walking thus a cinematograph record is made of the movements of the foot, and this is afterwards analysed. Records are also being made by electrical thermometers of the skin temperature of the feet when wearing different types of shoes. The gaits of various individuals and the effect of different kinds of shoe upon them are also being investigated, and records are being obtained which show the period of contact with the ground of the several parts of the foot. The results suggest that some shoes are much more likely to interfere with the normal gait than others, and this is throwing light upon correct shoe design and construction.

Health and Hospitals

Many of the activities of the Department have a more or less direct connexion with public health. Besides an investigation on the problems of sound-proof buildings, tests have been carried out at the National Physical Laboratory with a view to the reduction of noise from aircraft engines, large electrical transformers, road drills, and traffic. An investigation has also been begun on the production of static electrification in operating theatres of hospitals. Some of the anaesthetics in common use are of an explosive character, and the possibility of the production of electrostatic charges and the risk of their ignition by sparking is one which cannot be neglected. At the request of the Home Office a preliminary examination has also been undertaken of the risk of ignition of sparks due to static electrification in dry-cleaning works. Methods for detecting in the atmosphere small quantities of poisonous gases commonly occurring in certain industrial processes have been worked out.

Researches for the Dental Board on dental amalgams have been completed during the year. The results show that the composition of the alloy used in making the amalgam must lie within very narrow limits if the dentist is to produce fillings which will continue to fill cavities without contraction. The precautions which must be observed by the dentist in preparing the amalgam have also been established. The conditions both of manufacture and use of materials for amalgam fillings have been determined as the result of an extended series of experiments in which the changes of volume at mouth temperatures have been measured, sometimes over long periods.

Interesting physical work has been carried out in connexion with radium treatment of diseases under the auspices of the Radium Beam Therapy Research Board. The strength of the radiations from a specially designed radium unit, with which various radium "skin distances" can be obtained, have been measured in a water "phantom," a celluloid vessel containing water and giving the same scattering and absorption effects as a human body. By co-operation between the medical staff and physicists means have been developed for accurately measuring and controlling tissue dosage. Another investigation is in progress on the weak radiations which may reach distant parts of a patient's body during treatment. These radiations, it is believed, may be of importance in "constitutional effects" of radium treatment—for example, blood changes and general health. The method used is to measure the electricity produced (ionization) in air gaps in a laminated celluloid model of the body.

HEARING AND SPEECH IN DEAF CHILDREN

Dr. Phyllis Kerridge's Report

The Medical Research Council has just issued a report on the hearing and speech in deaf children[1] which is without doubt one of the most important and valuable contributions on the subject yet made in this country. The author is Dr. Phyllis M. T. Kerridge of the physiological department of University College, London. Dr. Kerridge, in co-operation with Dr. A. G. Wells, has conducted investigations in the special schools for children with defective hearing in London, at which between 500 and 600 day and residential pupils are educated. With a school population of this size, consisting of children with a wide variety of hearing defects, unusual facilities are offered for an investigation of this kind, and Dr. Kerridge has made the most of her opportunities. Nearly half the children were born deaf. Roughly two-thirds of the cases of acquired deafness—usually incurred before school age—were due to middle-ear disease, which in about half the cases was a complication of a specific fever, generally measles or scarlet fever.

Methods of Testing

In an exhaustive account of the various methods of testing hearing Dr. Kerridge shows that there is a difference of about 20 db. (decibels) between the zero of the pure-tone and gramophone audiometers over the speech area—that is, a reading of 30 db. loss of hearing when tested with the gramophone audiometer is equivalent to one of 50 db. with the pure-tone audiometer. She disposes of the objection put forward that in testing by air conduction with the pure-tone audiometer the sound is conveyed to the inner ear partly by bone by using a cap of spongy rubber to cover the periphery of the receiver so that no transfer of sound by bone could occur; further, by testing with and without the rubber cap there was no difference in the results. Attention is drawn to the fact that a pure-tone audiometric test gives a very good indication of the type and the cause of the deafness. Four main types of audiometric curve are considered. That one pathological process can be associated with more than one type of curve is proved by the study of those children with different types of curve for the two ears. Measurements of hearing in normal children with the pure-tone audiometer gave no indication that the zero lines of the audiometer for either air or bone conduction were inapplicable to children. These results showed the limits of individual variation as 20 db. for air conduction, and 20–40 db., according to pitch, for bone conduction. The relationship of speech to deafness and other factors is dealt with. Dr. Kerridge found only 3 per cent. of the children with no detectable hearing at any pitch.

The Use of Magnified Sound

Part II of the report deals with an experiment with magnified sounds carried out in co-operation with Dr. A. G. Wells. Magnified sound has been employed both in this country and abroad for some years in the education of the deaf, but the important thing in this experiment was that an attempt was made to assess the benefit obtained by a certain number of children, particularly in the production of normal-sounding speech. Accordingly an experimental class was arranged in each of the special schools. Each class was divided into two groups of children, one being referred to as "experimental" (those children using sound magnification), and the other as "control" (those not using sound magnification). Each "experimental" child was matched as nearly as possible with a "control" child. The teachers were told that the method of education of the class for a year was to differ from the usual only in that

[1] *Hearing and Speech in Deaf Children.* By Phyllis M. T. Kerridge. Med. Res. Counc. Spec. Rep. No. 221. H.M. Stationery Office. (2s.)

the experimental children should be allowed to hear, as far as they were able to do so with the instrument provided, while the control children should not. No special tuition was to be given to the experimental children either in speech training or in interpretation of what was heard. The experimental children would doubtless have profited much more had they had the help of special tuition, especially as to many the experience of hearing was almost or entirely new; but the benefit would then have been impossible to assess, for special tuition alone, even by ordinary methods, would have produced a benefit against which there would have been no standard.

Since, under the rules of the experiment, little or no individual work was done by any child of either group, any resulting benefit from the experiment has been a minimal one because of the restrictions. The experimental period was one year, and the instrument used was the "group-hearing aid" made by the Multitone Electric Company. Gramophone recordings were taken of each child's speech at the beginning and at the end of the year by the Marguerite Sound Studios, using the cellulose acetate process. The results of the experiment showed that: (1) twenty-one children (44 per cent.) had profited from the use of the amplifier considerably, and in many ways; (2) nine children (19 per cent.) had gained some benefit, mainly in improved speech; (3) twelve children (24.5 per cent.) had been able to appreciate rhythm in speech but nothing else; (4) six children (12.5 per cent.) had not benefited at all. The improvements in speech were confirmed by the gramophone records.

While nearly half the experimental and control children made equal progress in general school subjects during the year, about three times as many of the experimental children made more educational progress than their control partners. Further, it was estimated that about three-quarters of the children in the London schools for the deaf would benefit, at least in speech, from the educational use of sound amplifiers, and many of them in several other ways as well.

WORLD CONGRESS ON MENTAL HYGIENE

We are asked to announce that the second World Congress on Mental Hygiene will take place in Paris from Monday, July 19, to Friday, July 23, 1937, under the auspices of the French League for Mental Hygiene. Scientific sessions will be held in the morning and afternoon, and a number of visits to mental institutions, clinics, etc., are being organized, as well as tours before and after the meeting. The first World Congress took place at Washington in 1930, and the date for the second has been fixed so as to coincide with the Paris International Exhibition.

As attendance is not limited to members of particular organizations or official delegates, but is open to all interested in mental hygiene, it is earnestly hoped that members of the medical profession in this country will participate in a congress at which a large number of subjects within the wide field of mental hygiene will be discussed. The enrolment fee for medical members is 125 fr. (25s.). Copies of the preliminary programme and all particulars may be obtained on application to the secretary, the National Council for Mental Hygiene, 76/77, Chandos House, Palmer Street, London, S.W.1, with whom registrations for the Congress should be placed as early as possible.

In view of the attention which is being devoted by local authorities to the eradication of the bed bug from houses the council of the Royal Sanitary Institute has arranged courses of training in the work of disinfestation. These courses are intended more particularly for sanitary inspectors and for men employed at disinfestation centres. They will begin on May 18 and June 7 respectively. Full particulars can be obtained from the secretary, Royal Sanitary Institute, 90, Buckingham Palace Road, S.W.1.

Reports of Societies

ORAL INFECTIONS

At a meeting of the Section of Odontology of the Royal Society of Medicine on March 19, Mr. WARWICK JAMES presiding, Dr. E. WILFRED FISH discussed the clinical significance of oral infection, the situation and spread of the infecting organisms, and of their toxic products in pyorrhoea, ulcerative stomatitis, and caries in relation to the effect of these diseases on the general health. Owing to the wide nature of the subject, and the fact that at the same meeting three cases of osteomyelitis of the jaw were brought forward, he confined himself mainly to osteomyelitis.

Dr. Fish said that his purpose was to review in the light of recent findings the immediate effect of the organisms which inhabited the paradontal sulcus. Pyorrhoea, as the name suggested, was a chronic suppurative inflammation of the marginal tissues of the gum, and in an established case was characterized by a paradontal surface ulcerated and lined with granulation tissue on which a degenerated epithelium grew or wilted as a scanty remnant. He drew attention to the tendency of the horny epithelium to split at the point where it was joined by Nasmyth's membrane; the cuticle of the unmanicured nail of the monkey showed exactly the same splitting, with the invagination of keratin, between the point where the horny layer of the skin joined the horny layer of the nail. Sometimes two teeth seemed to share the Nasmyth membrane between them, but the interdental space between the two was entirely filled with tissue which precluded both pyorrhoea and caries from developing in that area. There was always, however, some indication of the constant trauma to which the gum margin was subjected. If the pocket was shallow abrasion often amounting to actual ulceration was produced at the edge of the gum on the spot where the masticatory stress fell. As time went on the surface of dead cementum inside the pocket became covered with tartar and bathed in a serous exudate in which organisms lived and multiplied, so that there was a continuous toxic irritation of the ulcerated surface inside the pocket which prevented healing. The organisms were prevented from actually growing into the tissue by the leucocytes, but there was a necrotic refractory mass of which the tissues could not rid themselves, and this mass formed a refuge for germs. Dr. Fish compared the pathology of pyorrhoea with that of bone necrosis and sequestration. In each case an infected sequestrum was surrounded by a non-infected area of bone absorption, which was caused by toxic diffusion.

Bone Absorption and Fibrous Tissue Disorganization

Perhaps the best way to appreciate the condition of the bone was to consider the sequence of events when the bone itself was actually infected by the organisms. The sequestrum infected with organisms formed the centre of an area of widespread bone absorption. When a tooth was extracted organisms might be propelled into the vessels of the bone forming the socket. The trauma of extraction bruised the bone, and in so doing occluded the vessels and imprisoned the organisms. The organisms made the best of this piece of good fortune, since they were no longer in danger of attack from the leucocytes, and they increased enormously, eating every shred of soft tissue, and from this focus they spread in all directions. The leucocytes hurried to the spot, the polymorphonuclear leucocytes getting their first and forming a solid barrier as effectively as possible. The leucocytes at least delayed the spreading of the organisms, which were imprisoned for the moment, but the stage was set for the freeing of the sequestrum. According to the text-

books there were two ways in which bone could be absorbed, one by the action of osteoclasts and the other by what was called vascular absorption, but there did not appear to be any evidence of this latter, and the theory was perhaps devised because it was not often that osteoclasts were seen at work.

Bone in a chronically irritated condition could show a large number of Howship's lacunae. If the irritation became too severe the osteoclasts broke up and were replaced by round cells. Observations on chronic inflammatory reactions in connective tissue suggested the following course of events: during the invasion streptococci attempting to enter the tissues were met by a wall of polymorphonuclear leucocytes, while the toxic matter diffusing into the surrounding tissues was countered by a round-celled infiltration. When repair set in wandering cells ate the soft tissue debris and the fibroblasts were stimulated to produce scar tissue. In the same way osteoclasts which were formed in response to toxic irritation ate the contaminated bone, while, if the irritant became diluted, osteoblasts were stimulated to lay down new bone and produce sclerosis. The sequence of events in osteomyelitis was therefore fairly clear. The organisms being trapped in the damaged bone in the socket, the surrounding matrix became contaminated by the soluble toxic products of those organisms which diffused into it along the lymphatics. The presence of these toxic products which diffused out from the sequestrum into the surrounding bone stimulated the production of osteoclasts at an appropriate distance from the infection, and these immediately started to eat away a certain amount of the bone surrounding the sequestrum. It became a question whether the osteoclasts could eat away the bone around the sequestrum before the infection reached the same point. If the osteoclasts succeeded, then they formed a gap between the infected and uninfected bone, which gap would be filled with leucocytes, though the toxic products of the organisms continued to spread. It was important to remember that though the infecting organisms became localized toxic material still diffused from them into the surrounding tissues.

Effect on General Health

The danger to the patient's health was first from the bacteria showered into the blood stream on, for example, extraction of teeth. Normally this transient bacteriaemia disappeared very rapidly and did no harm, but there were exceptions. The organisms might become implanted on the heart valve, causing an infective endocarditis. If possible no tooth should be extracted while fibrinous vegetations were still present. The extraction of any dead tooth was still a grave danger, even if the pocket had been cauterized. It should only be removed if an acute abscess formed causing severe pain. If a patient with acute non-infective endocarditis had advanced pyorrhoea with sloughing granulations around the gum margin he was in very grave danger, even if no surgical interference took place. It was really a choice of evils.

Gingivectomy followed by sound keratinization limited the infection and prevented toxic absorption as effectively as extraction. But gingivectomy, while curing the pyorrhoea, might cause a bacterial shower; in one case out of four that had been found to occur. Another danger from a bacterial shower was that during the few minutes or possibly hours that the organisms were circulating in the blood the individual might bruise a bone and imprison some bacteria in the clot. If this happened there was nothing to prevent them from growing and setting up an osteomyelitis. Apparently the only other possible danger was that these organisms temporarily in the blood stream might find a home in the joints and ends of the bones, thereby producing an arthritis. Theoretically the bacteriaemia of pyorrhoea was only a danger in the case of subacute or acute infective endocarditis or in the case of a healthy person who happened to bruise a bone when the organisms were present in the vessels at the point of such injury. The clinical instance of "dry socket" was evidence of this, since it occurred only when the bone was badly bruised. The chronic toxic absorption into the tissues was, however, a much more constant menace. The radiographic demonstration of local tissue destruction was a useful indication that absorption was taking place. Patients varied in their sensitivity to such toxic matter. Certain obvious indications for thorough eradication of doubtful or possible sources of toxic absorption were afforded, of which derangement of liver or kidney was perhaps the most certain. In pharyngitis and gastro-intestinal disease the danger of swallowing irritating discharges must not be overlooked. It was very important when called upon to eliminate toxic absorption in the tissues to eradicate it completely, and not merely carry out an isolated dramatic operation.

Dr. J. WALLACE GRAHAM gave a preliminary report on the toxicity of sterile filtrate from paradontal pockets, the effect of immediate injection into experimental animals of the contents of such pockets having been investigated, and Professor H. F. HUMPHREYS discussed three contrasting cases of osteomyelitis in the jaw, all of which happened to be under treatment at about the same time. One was a very chronic osteomyelitis in the edentulous upper jaw of a middle-aged woman; another a subacute osteomyelitis of the mandible in a boy of 12, and the third an acute osteomyelitis of the mandible following extraction under local anaesthesia of the first lower molar, in which intense suppuration spread along the outer surface of the mandible from angle to to angle, followed by death in three weeks from septic pneumonia and cavernous sinus thrombosis.

SPA TREATMENT IN GYNAECOLOGY

The Section of Physical Medicine and the Section of Obstetrics and Gynaecology of the Royal Society of Medicine combined on March 19, with Dr. GEOFFREY HOLMES in the chair, for a discussion on physical treatment of pelvic disorders in women. Electrotherapy was expressly excluded.

Dr. MURIEL KEYES of Harrogate opened with a description of general and local treatment at a spa, and gave a long list of ailments which benefited more or less from spa treatment, sometimes in association with other measures. She insisted on the need for care in the selection of cases, especially with a view to excluding early malignancy. It was better to refer many cases back for independent examination by a surgeon or gynaecologist than to overlook one such case and accept it for spa treatment. In spa gynaecology a wide clinical experience kept continually alive by special hospital experience, combined with an honest mind and meticulous care in examination, was absolutely necessary. Spa therapy in gynaecology was made much use of on the Continent. British spas were adequate for this purpose, but the fact needed wider announcement.

Dr. LEONARD BOYES of Woodhall Spa said that in functional cases the giving of bromo-iodine baths and waters such as Woodhall possessed, with dietetic control, should prove helpful. Conditions successfully treated had included pelvic cellulitis, subinvolution, and sterility due to congestion of the uterus. Spa treatment was useful as a preparation for operative measures. Many a case of fibroids, toxic from constipation, and exhausted from haemorrhage, had been made a far better operative risk and given an easier recovery from operation as the result of a course of spa treatment.

Physical Treatments

Professor DANIEL DOUGAL said that physical treatment had been an accepted method in gynaecology right up to

the beginning of the modern surgical era. Since then its popularity had declined; this was not due to bias on the part of those who practised gynaecology but rather to the fact that it failed to produce results in any way comparable to those obtained to-day by surgical methods. That being so, it would be a retrograde step to recommend physical treatment for conditions which they knew could better be treated by surgical operation. There were, however, many conditions for which surgery was unsuitable or insufficient, and in many of these physical treatment gave excellent results and should be employed as a routine whenever possible. The physiotherapist should realize that his position was ancillary and should only treat those cases referred to him by a gynaecologist, and that rule should be applied not only to the physiotherapist who specialized in gynaecology but to the gynaecologist who specialized in physiotherapy. Physical treatment might operate by stimulating metabolism or by acting directly on diseased structures; the former method was much more valuable in gynaecology, the latter had a very limited application. He agreed that in every case of disturbed function the general health should be the first consideration, and all possible measures be taken to restore it to normal. Although the reproductive function was controlled by the anterior pituitary and ovarian hormones it was still true that the general health was all-important. Again, gymnastic exercises which strengthened the muscles of the pelvic floor were a useful prophylactic measure in reducing the incidence of prolapse. Uncomplicated backward displacements of the uterus generally produced no symptoms whatever, but when they did he thought it a better and quicker method of treatment to operate on them. In the field of infection physical methods might be most usefully employed. Acute and subacute infections of the lower genital tract could be treated expectantly. On the other hand, pelvic infections required more active treatment. Acute salpingitis was now treated expectantly, as active surgical treatment resulted in a very much higher mortality and also interfered with the complete recovery of the diseased structures which might be expected to occur in a large percentage of these cases. Physical methods were of no value as a curative measure in the treatment of uterine fibroids, and might even be harmful in delaying necessary surgical treatment. The surgical treatment of these tumours was so successful that it was a great mistake to depart from present practice and adopt methods which at best were only palliative. As for physical treatment before and after operation, no doubt many patients would be better surgical risks if they received a course of spa treatment before operation, but it was doubtful whether the slight improvement in the results would compensate for the delay. The average patient who had undergone a major operation returned home at the end of three weeks and was then placed under the care of the family doctor and instructed to take things easily for another month or so. He was sure that an intermediate period at a spa hospital would be beneficial if treatment were so planned that it hastened the patient's convalescence and did not actually prolong it.

Benefits and Dangers of Spa Treatment

Dr. J. D. BARRIS said that obstetricians and gynaecologists did appreciate the value of spa treatment in certain of their cases. They advised many patients suffering from minor pelvic disorders to take a course of treatment at a spa, preferably British. But the object in sending them there was on account of the beneficial effects upon their general health rather than the specific effect upon their local condition. Co-operation between the physiotherapist and the gynaecologist was essential. All patients should first be seen by a gynaecologist in order to establish the diagnosis, to make sure that no serious pelvic lesion had been overlooked and no necessary surgical treatment delayed. He considered that the functional side of dysmenorrhoea was quite unsuitable for spa treatment. The patient was usually a young woman who was perfectly well between her periods. It was essential to her recovery that she should be encouraged to lead a normal life, that "her mind should be taken away from her pelvis," and that she should not regard herself as an invalid, whereas the atmosphere of a spa would tend to suggest to her that she was. Nor was all dysmenorrhoea functional. It might be due to tumours of the uterus or other causes for which surgical or radiological treatment gave the best results. Patients undergoing the menopause, again, were unsuitable for spa treatment, for they, too, were best helped by being encouraged to live a normal life. In cases of pelvic inflammation, not of an acute nature, with no pus present, local heat or spa treatment did good. In cases showing pelvic pain and no definite physical signs the type of patient must be chosen carefully for physical methods. Sometimes the pain in these patients was nothing but a psychological barrier raised by them to escape their duties, and to send them for spa treatment did not really help them in the long run.

General Discussion

A French visitor, Dr. MOUGEOT, gave some account of the virtues of French spa waters, and in particular of a device for facilitating the absorption of natural gases through the skin, a method he had used for the treatment of circulatory disorders, and which he thought applicable to some gynaecological conditions. Dr. CLIFFORD WHITE agreed that spa treatment did seem to stimulate the hormone secretion and alter the menstrual rhythm. But when Dr. Keyes spoke about endometritis as suitable for spa treatment he was completely lost, because endometritis could not be diagnosed until a section was taken. He would never think of advising surgery for a patient who merely complained of odd pains in the pelvis, but with a definitely enlarged tender ovary he was inclined to suspect some pathological condition which could be demonstrated under the microscope, and one not likely to be benefited by general methods.

Dr. S. K. WESTMANN said that in addition to the use of spas and waters there was another more recently applied form of physiotherapy—namely, physical exercises, with or without spa treatment—which was worthy of consideration. This helped to conserve the elasticity of the muscles of the pelvic floor. But before any physical treatment was recommended a most careful gynaecological examination must be carried out, for both spa treatment and physical exercises were strong stimulants which might rightly be compared with a dangerous drug. Sir COMYNS BERKELEY said that on hearing the long list of diseased conditions which the opener had said could be alleviated by spa treatment he rather felt that he must have done great numbers of operations unnecessarily!

Dr. GEOFFREY HOLMES said that as a spa practitioner he was interested in what was evidently a general impression amongst gynaecologists as to the danger of the "spa complex." But the whole of the psychological atmosphere of a spa was designed to counteract the adverse influences and dangers mentioned. As to the possibility of serious pelvic disease being overlooked, he could assure them that many people went to spas without seeing a gynaecologist, and it was at the spa that it was discovered that they had serious pelvic disorders. He saw many women with commencing arthritis in the decade of the menopause, and he was personally satisfied that there was a clinical entity which might be described as menopausal arthritis, and that of all the forms of arthritis at spas none responded better to spa treatment. Dr. MURIEL KEYES, in replying on the discussion, said that it was quite a wrong impression that people at spas were "taught how to be ill"; on the contrary, they got a little holiday and were taught how to live and how to rest. It had been said that the young dysmenorrhoeic patient should not be sent to a spa. But she was toxic and constipated, and spa treatment did her good; perhaps best of all, it got her away from her mother!

PATHOLOGY OF CRIMINAL ABORTION

At a meeting of the Liverpool Medical Institution on March 11, with Mr. R. KENNON in the chair, Dr. W. H. GRACE read a paper on the pathological aspects of criminal abortion.

After briefly reviewing the historical references to the subject, Dr. Grace quoted the sections of the Offences Against the Person Act which were involved, and noted that only the word "miscarriage" was used, meaning the emptying of the uterus at any stage of the pregnancy; that there was no attempt to define the word "unlawfully" or to define "lawful" emptying of the uterus; and that there was no difference in the nature of the crime if the uterus did not contain the products of conception. Death due to criminal abortion was usually one of two types: (1) a quick death—usually occurring within half an hour of the abortion and caused often by shock, and more rarely by air embolism; and (2) a lingering process varying from a matter of days to weeks or more in which death was due to sepsis.

Methods of Procuring Abortion

The methods of procuring criminal abortion were next considered under the following headings: (1) violence applied generally—including rolling downstairs, kneading or compressing the abdomen, etc.; (2) internal administration of drugs—here the speaker made the following observation: "There is no drug and no combination of drugs which, when taken by the mouth, will cause a healthy uterus to empty itself unless it be given in doses sufficiently large to endanger seriously, by poisoning, the life of the woman who takes it"; (3) mechanical injuries to the uterus and its contents—this section was subdivided into (*a*) direct violence, including the use of uterine sounds, catheters, wire, pieces of wood, umbrella ribs, hairpins, penholders, etc., and (*b*) injection of fluids —soap solutions and sodium bicarbonate, for example. Dr. Grace described his method of examination in cases of suspected criminal abortion, emphasizing the importance of keeping all objects and organs which might be used as evidence, and concluded his paper by referring to the subject of dying declarations and the method of ensuring their legality.

General Discussion

In the discussion which followed, Dr. E. CRONIN LOWE mentioned the difficulty often met with in those cases in which death had ensued from self-attempted abortion. Often there was no evidence of damage to uterus, cervix, or vagina, and death had apparently resulted from shock, associated with the psychological disturbances of apprehension and fear. The need to follow Dr. Grace's advice as to collecting any fluid in the vagina was important, as this might in certain cases give the only evidence available of attempted interference. He asked Dr. Grace if he had observed the tendency to septic infection to occur more often in the right broad ligament in those cases of death from sepsis, even although little or no evidence of damage to the uterus itself was found. He quoted two recent cases in which these findings were present, and although in neither of them could criminal interference be proved, yet in both suspicion was very strong, and he suggested that it was a point worth remembering that right-sided pelvic infection in such cases suggested interference by some mechanical means and probably carried out by someone other than the deceased.

Dr. W. A. MACKAY, referring to the possible association of right-sided lesions with interference, said that this had been suggested by the occurrence of two somewhat similar cases where there had been a lesion in the right broad ligament and where attempted abortion had been suspected. In the first, the occurrence of a rigor soon after bimanual examination led to surgical exploration. Removal of a great part of the thrombosed broad ligament and drainage was followed by recovery. In the second case the patient was too ill for operation when she came under observation. There was a very obvious affection of the right side. Although after death and after hardening of the parts no evidence of interference could be found, some time later rumour, which was probably well informed, insisted that abortion had been procured. With regard to reporting cases to the police, doctors were in no sense criminal detectives, and usually nothing should be done. In case of death communication with the police became a duty.

Mr. M. DATNOW agreed that the causes of miscarriage should come under three main headings. General violence, Mr. Datnow thought, should include shock and fright, as he had come across a number of such cases, although quite often severe physical injury did not result in any disturbance of the pregnancy. In connexion with drugs Mr. Datnow referred to certain animal experiments which he had carried out, using many of the well-known abortifacients, but he had never succeeded in bringing about abortion with them—in fact some actually tended to prolong the period of pregnancy; lead, on the other hand, almost invariably produced abortion. He did not agree that local injury by the injection of fluids would bring about abortion unless the fluid was injected into the uterine cavity. He drew attention to certain soap pastes which were being extensively used on the Continent to bring about abortion therapeutically. In conclusion, the speaker concurred with Dr. Grace's views on the importance of keeping all material that was removed from cases of criminal abortion so that it would be available for inspection and examination by all concerned.

Mr. C. H. WALSH stated that in his opinion criminal abortion was on the increase. A favourite method was by intra-uterine injections, which left little or no trace of trauma, and rarely any incriminating material, making it difficult to detect the evildoer. He agreed with Dr. Grace that there was no known drug taken by mouth which would procure abortion without disabling or killing the mother, and instanced a recent fatality which had occurred in a patient admitted to hospital moribund as the result of taking an overdose of "female pills" so consistently and largely advertised in the daily press.

Pathological Specimens

At the same meeting a series of pathological specimens taken at operation or necropsy were shown. Dr. W. E. COOKE and Dr. G. RONALD ELLIS demonstrated post-mortem specimens from two cases of congenital microcolon. Dr. Ellis at the same time described a case of multiple cerebral abscesses secondary to bronchiectasis. Professor R. E. KELLY, Mr. A. S. KERR, and Mr. R. KENNON showed two post-anal dermoids which had been removed at operation, and Mr. Kerr and Mr. Kennon described also a suprasternal dermoid and a case of tuberculous kidney with giant ureter. After some discussion on this last case Dr. T. F. HEWER and Dr. A. DOUGLAS BIGLAND gave an account of a case of subarachnoid haemorrhage from an aneurysm of the circle of Willis.

The sixth general meeting of the Midland Mental Pathological Society was held at the Anatomy Theatre of Birmingham University on March 18, with the president, Sir GILBERT BARLING, in the chair. Sir ARTHUR J. HALL gave a lecture on "Some Features of Chronic Epidemic Encephalitis (Lethargica)." This was illustrated by many lantern slides and a cinematograph demonstration of the characteristic poise and gait, the kinesia paradoxia, and the lid movements associated with efforts to overcome oculogyric crises. Dr. STANLEY BARNES, in proposing a vote of thanks, remarked on his association with the lecturer and his special study of the disease. Dr. B. H. SHAW seconded the vote, which was carried with enthusiasm. Dr. J. H. MALLOY contributed to the discussion, and Sir ARTHUR HALL replied.

Local News

ENGLAND AND WALES

Merseyside Hospitals Council

At the annual general meeting of the Merseyside Hospitals Council, held at the Liverpool Town Hall on March 24, Mr. W. Sutcliffe Rhodes, chairman of the David Lewis Northern Hospital since 1934, was elected to succeed Lord Cozens-Hardy as chairman of the Council. In 1935 Mr. Sutcliffe Rhodes was invited by Lord Derby and Sir Benjamin Johnson to join the newly formed Associated Voluntary Hospitals Board, and he has been nominated a member of the committee of the proposed Royal Liverpool United Hospital, whose Bill is now before Parliament. He has taken an active interest in the voluntary hospitals for many years, and was first elected to the committee of the David Lewis Northern Hospital 13 years ago, and has represented that institution on the Merseyside Hospitals Council since 1934. In 1936 he was invited to become chairman of the Medical Charities Committee of the Liverpool Council of Social Service.

Hospital Libraries

A meeting to further the hospital library movement was held, under the auspices of the British Red Cross and Order of St. John, at County Hall, London, on March 17. The values attaching to a hospital library might be supposed to be the same whatever the character of the hospital, but there are differences, as were shown by speakers representing successively the voluntary hospitals, the general municipal hospitals, and the mental hospitals. Sir Alfred Webb-Johnson, after referring to the value of books as an aid to recovery during the period following operation, mentioned that the Middlesex Hospital was fortunate in having a well-equipped patients' library and a good nurses' library in addition. But without an efficient librarian, such as they had at the Middlesex, half the value of book collections for patients was lost. His view was that the book depot should be entirely in the librarian's charge, and that patients who remained in hospital a long time should have the facility for obtaining books on request, for which purpose the hospital would need the backing of a public library. It was important to provide light and illustrated periodical literature for patients incapable of continuous mental effort. Dr. Letitia Fairfield, who spoke from the point of view of the London County Council hospitals, said that these hospitals contained a large proportion of chronic patients. Such patients often tended to exhaust the sympathy and patience of their friends, and their need for sustaining literature was more serious than that of the acute patients. It might be thought that people confined for long periods to bed could undertake definite courses of study, but actually their disability was apt to cause mental stagnation. One of the aims of the hospital librarian, therefore, must be to rouse such patients to a belief in their own capacity, to inspire them with the delights of literature and to bring into the sick room the past as well as the present. Reading had not only a mental but a physical effect, and a ward was a better and happier place if the patients had something to think about besides their own unfortunate condition. Sir Laurence Brock, chairman of the Board of Control, spoke of the special position of patients in mental hospitals. It was not always realized how many patients in such hospitals were capable of reading and enjoying books. Reading was not merely a harmless sedative, but often had definite therapeutic value in that it helped patients to forget real or imaginary troubles. He reminded the audience that the tastes of mental patients were not altered as a result of their mental instability: mathematicians, for example, still wanted books on mathematics. The Red Cross effort to encourage hospital libraries was the more necessary because of the limit set to the efforts of local authorities. It would, of course, never be possible to allow outside voluntary workers the same liberty of access to mental as to other types of hospitals, but there were many ways in which the advice and assistance of the British Red Cross and Order of St. John Library could be of value in this special field. The meeting was also addressed by two librarians, the borough librarian of Watford, Mr. George Bolton, and the head librarian of the Lewisham Hospital, Miss Kellaway. It was mentioned that the hospital library movement was a "war baby"—one of the very few beneficent outcomes of the great war.

Attack on Maternal Mortality in Birmingham

As one line of attack on maternal mortality in Birmingham a "flying squad" service has been established with the object of bringing the best medical and nursing aid to the bedside of the patient in cases of severe obstetrical shock, haemorrhage, etc. This "flying squad" operates from the Birmingham Maternity Hospital, and consists of a complete emergency outfit equipped to deal with every obstetrical emergency and under the charge of a staff nurse, who is a trained midwife of the hospital. The scheme is worked in connexion with the Birmingham Health Centre and the St. John Ambulance Brigade, and arrangements have been made with the latter for an ambulance to be available within a few minutes of receiving a call to take the equipment and the nurse to the patient's home, the surgeon going independently. At the annual meeting of the governors of the Birmingham and Midland Hospitals for Women it was stated that the "flying squad" had been called out five times so far, and in three of these it had been the means of saving a woman's life. This is a highly commendable scheme, and it is to be hoped that hospital authorities in other areas will not be slow in following the example of Birmingham.

SCOTLAND

Vacation Courses for Students

Professor T. K. Monro, formerly of the chair of practice of medicine at Glasgow University, addressing the students at St. Mungo's College, Glasgow, at the prize-giving ceremony on March 18, said that great progress had been made of recent years in the prevention, diagnosis, and treatment of disease by public health authorities and laboratory workers. The general practitioner, however, was the first line of defence against disease, and it was essential that his training should be as thorough as possible. He believed that before long medical students would be required to devote part of the long summer vacation to hospital work. There was a general feeling, even among students, that the July to October holiday was unnecessarily long, and that instruction, which was clinical and practical, might be instituted during this period. Professor Monro thought that the great reputation of Scotland as a training ground for good general practitioners was due to the high quality of the teaching which had been available in its medical schools for a long time.

Elsie Inglis Memorial Maternity Hospital

At the annual meeting of the Elsie Inglis Memorial Maternity Hospital, Edinburgh, on March 18, Lady Ruth Balfour, M.B., presiding, stated that the death rate in this hospital during the past year had been only 4 per 1,000. In moving the adoption of the annual report of the combined women's hospitals she said that in the Bruntsfield Hospital 855 in-patients and 2,000 out-patients had been treated during 1936, while at the Elsie Inglis Hospital the admissions had been 1,285 and the number of confinements 1,131. It was proposed to open a new nurses' home at the Bruntsfield Hospital and a new out-patient clinic as well as an isolation block at the Elsie Inglis Hospital. The

accounts of income and expenditure showed a deficit of £3,204, but legacies amounting to £6,575 have been received.

Edinburgh Dental Hospital

At the forty-fifth annual general meeting of the Incorporated Edinburgh Dental Hospital and School Professor Sydney Smith, who took the chair, announced that the governors proposed to extend the hospital buildings at a cost of about £35,000. Towards this sum the Dental Board of the United Kingdom had promised a donation of £5,000. At the present time this was the largest dental school in Scotland and the second largest in Great Britain, with 250 students in 1936. The premises had therefore become inadequate and the equipment was not sufficiently up to date, so that a large addition to the accommodation, equipment, and staff must soon be made. The annual report shows a great advance in the work done by the hospital during 1936. The total number of conservation cases was 19,395, compared with 13,313 in 1935. In the prosthetic department the number of dentures, repairs, etc., was 1,978 compared with 1,766, and the number of extractions increased from 17,708 to 22,742. The number of new patients during 1936 was 9,921 compared with 8,299, and the total attendances 29,369 against 22,194. With regard to finance the report shows a surplus of £684, but although this is regarded as satisfactory, all the money available will be needed for extension and equipment of the buildings, and it is proposed shortly to issue an appeal to the public for funds.

IRELAND

Crown Nominee on G.M.C.

The *London Gazette* of March 19 announces that the King, with the advice of his Privy Council, under the provisions contained in the Medical Acts, has renominated Colonel Thomas Sinclair, C.B., F.R.C.S., M.P., to be, for a period of five years from May 13, 1937, a member of the General Council of Medical Education and Registration of the United Kingdom, for Ireland. Colonel Sinclair has served on the Council since 1927, when he was nominated to succeed Sir Edward Coey Bigger.

The Belfast Meeting: Accommodation

Dr. F. P. Montgomery, chairman of the Housing and Lodgings Committee for the 105th Annual Meeting of the British Medical Association at Belfast next July, informs us that hotel accommodation in particular and other accommodation in general is being rapidly booked up for the period of the meeting. All officers of Sections and all speakers who have undertaken to take part in the Sectional proceedings should arrange accommodation as soon as possible if they have not already done so. Requests for hotel accommodation should be sent direct to Thos. Cook and Son, Ltd., 27, Royal Avenue, Belfast, and requests for all other types of accommodation should be sent to the office of the Annual Meeting, Whitla Medical Institute, College Square North, Belfast.

Royal Maternity Hospital, Belfast

The registrar's report of the Royal Maternity Hospital, Grosvenor Road, Belfast, covers the period from January, 1932, to December, 1935. It deals with the work of the Belfast Maternity Hospital until July 31, 1933, and after that date of the Royal Maternity Hospital, which was opened on August 1, 1933. The latter hospital contains a unit for the treatment of all forms of potential and established sepsis. To this unit are admitted many emergency or unbooked cases, often frankly septic on admission. For the year 1935 the maternal mortality rate was 1.6 per cent. for all admissions, 0.6 per cent. for ante-natal admissions, and 4.4 per cent. for emergencies. Owing to a rise in the rate for the last-named category these figures are slightly less satisfactory than those of the preceding years. Concise summaries are given of the seventy-five cases involving maternal death which occurred during the whole period under review. The series includes four cases of acute yellow atrophy of the liver. The statistics for maternal morbidity show a gradual improvement. The rate for 1935 was 4.9 per cent. Analysis shows a high incidence of infection of the urinary tract with thirty-nine cases, comparing with forty-one cases of puerperal sepsis during the whole period. The total number of patients admitted in 1935 was 1,413. Triplets were born on two occasions in the course of that year, and two cases of triplets are also recorded for 1932.

Correspondence

Combined Universities Election

SIR,—May I, through your columns, thank all those who gave me their support at the recent election, and especially those who at headquarters or in certain Divisions (particularly in Birmingham) put themselves to considerable trouble by taking very active steps in this direction?

I should like it to be known that I undertook this candidature, against my own inclination, in pursuance of the definite resolutions of the Representative Body of the British Medical Association: (1) "That with a view to ensuring the presentation to Parliament of expert medical opinion on matters relating to the health of the community or involving the welfare of the medical profession, the Representative Body approve the principle of securing the services of a Member of Parliament intimately acquainted with the aims and policy of the British Medical Association": (2) "That steps be taken forthwith to make preliminary inquiries for the selection of a medical practitioner intimately acquainted with the aims and policy of the Association with a view to his election to Parliament through one of the University seats." The Committee of the Association charged with the duty of implementing these resolutions urged me, when the parliamentary vacancy occurred, to become a candidate, and I did not feel at liberty to refuse.

The expectation of success in such a candidature even in what appeared to be favourable circumstances was perhaps never very high, but the actual figures of the result were disappointing. What conclusions the Council may draw from them, or what action may follow upon such conclusions, I do not, of course, know. The result, however, appears to indicate that even in a University constituency and with a candidature genuinely independent of all party considerations, common action among doctors as such, or teachers as such, or between the two professions, is not to be expected. Divided loyalties, combined with a considerable measure of complete indifference, produce curious outcomes which can be tested only by experiment.—I am, etc.,

London, N.W.11, March 24. HENRY B. BRACKENBURY.

SIR,—Those who made some effort to promote the success of Sir Henry Brackenbury's candidature in the recent election contest must feel greatly disappointed at the result. The election followed on usual party lines, and the reasoned argument in Sir Henry's election address on complete independence seemed to carry little weight with that portion of the constituency which included medical graduates. When the very small number of medical men now in Parliament is considered, surely it must have occurred to the medical portion of the constituency that the addition of a member of his calibre, experience, and past record of work for the profession

would have been alike an asset to the profession and to the House of Commons itself. The past and passing generation of medical men are generally aware of this, but it is likely that the younger generation are completely ignorant of the efforts which have brought them a heritage of a better professional life than that extant thirty years ago, and it is probably the younger generation which has swayed this election.

It is not only on questions of intrinsic interest to the profession—national health insurance, hospitals, organization of public health services—that medical influence should be exercised in Parliament, but the great problem of number and quality of the population now looming in the near distance, involving such human biological problems as sterilization of the unfit, birth control, reform of the abortion laws, and maternal mortality, will need adequate medical representation if legislation is to be effective and just. Again, there have been repeated attempts to foist an absurd system of medicine into official recognition, and it was chiefly due to Sir Henry's evidence before the committee of inquiry that the last attempt failed completely. It is said that public memories are notoriously short, but surely this shallow-pated amnesia should not inflict the medical profession.—I am, etc.,

Warrington, March 28. J. S. MANSON.

The Value of Liver Extracts

SIR,—We wish to draw attention to the report of the meeting of the Section of Therapeutics and Pharmacology of the Royal Society of Medicine in your issue of March 20 (p. 629). Dr. Janet Vaughan is reported as having made the following remarkable statement—namely, that if she suffered from pernicious anaemia "nothing would induce her to be treated with anahaemin." Ungley, Davidson, and Wayne (*Lancet*, 1936, **1**, 349) published full details of a most carefully controlled series of thirty-six cases of pernicious anaemia treated with anahaemin which clearly demonstrated that anahaemin is one of the most potent preparations of the anti-anaemic principle available anywhere in the world. Since the publication of this paper we have treated many more cases of pernicious anaemia with anahaemin, with the same results. We find that an initial injection of 4 c.cm. will produce a maximal reticulocyte response, a satisfactory red cell increase, and a rapid improvement in the clinical condition. Thereafter 2 c.cm., given at ten-day intervals, soon brings the blood count up to normal. So satisfied are we with the activity of anahaemin that when assessing the potency of new experimental liver fractions we use this substance for choice for control purposes. For maintenance treatment we have kept twenty cases of pernicious anaemia for a period of one year at a normal blood level by the injection of 5 c.cm. of anahaemin at two-monthly intervals.

It is for these reasons that we are at a loss to understand the statement attributed to Dr. Vaughan quoted above. The fact that Dr. Lucy Wills obtained responses in monkeys with crude preparations of liver extract and not with anahaemin is of scientific interest, but since the monkeys were suffering from an anaemia produced by dietary deficiencies and were certainly not suffering from Addisonian pernicious anaemia her results do not indicate in any way whether or not anahaemin is of value in the disease occurring in human beings. Lastly, we are at a loss to understand Dr. Vaughan's calculation that it would have cost her £7 to "cure" her last patient with anahaemin.—We are, etc.,

STANLEY DAVIDSON.
Aberdeen, March 22. HAROLD W. FULLERTON.

SIR,—In your issue of March 20 you publish an abbreviated report of some remarks I made at a meeting of the Section of Therapeutics and Pharmacology at the Royal Society of Medicine. I feel that as they stand the statements are open to misinterpretation, and I should like to amplify them and to correct one misstatement of mine. I emphasized that my experience of treating patients with Addisonian pernicious anaemia in relapse with anahaemin had been limited and that my objections to the pure preparations were theoretical. The work of Subbarow, Jacobson, and Prochownick (*J. Amer. chem. Soc.*, 1936, **58**, 2234) shows that there are at least three chemical substances which can be isolated from crude liver extract and which have varying haemopoietic activity, but appear to be complementary to one another in their effect on Addisonian pernicious anaemia. These observations, together with those described by Dr. Lucy Wills, suggest that possibly the purer fractions like anahaemin do not contain all the haemopoietic factors. Until more is known of the relationship of these factors, I feel I would prefer for myself to play for safety and use a crude extract which contains them all rather than a pure preparation which possibly may lack one or other of them in adequate concentration. I admitted, however, that this was a purely theoretical objection.

The practical experience of Professor Davidson and Dr. Ungley all emphasize the value of anahaemin. I stated that all the pedigree cases of pernicious anaemia I have had the opportunity to treat have maintained a completely satisfactory count on 1 c.cm. of anahaemin once a month. This statement was not reported. Owing to the complex chemical procedures involved in their preparation the purified extracts are necessarily more expensive than the less pure, and in patients of the hospital class even the difference of a few pence must often be considered. A monthly maintenance dose of 4 c.cm. of less pure preparations costs less than 1 c.cm. of anahaemin. My calculation of the cost of £7 to produce a normal blood count was based on what I am now told is an out-of-date price. I apologize for my error. The patient required 28 c.cm. to raise her red cell count from 1,300,000 per c.mm. to 4,700,000 per c.mm., which at the present quoted retail price would mean £4 4s. Of course patients vary considerably in the amount of extract required and therefore in the cost of treatment.

It is only, however, by the further preparation and clinical trial of such pure preparations that we can hope to solve the problem of the nature of the haemopoietic fractions in liver, and as a step to the solution of this problem the importance of anahaemin cannot be overemphasized.—I am, etc.,

London, W.12, March 23. JANET VAUGHAN.

SIR,—In your report of the meeting of the Section of Therapeutics and Pharmacology (*Journal*, March 20, p. 629) Dr. Janet Vaughan is quoted as saying that "personally if she suffered from pernicious anaemia nothing would induce her to be treated with anahaemin." She spoke of "the danger of treating patients with these highly clarified fractions," apparently on the assumption that "the purer extracts did not contain all the haemopoietic factors." That monkeys rendered anaemic by dietary deficiency respond to a haemopoietic factor present in campolon, but absent from Dakin and West's fraction, is not a sufficient reason for treating Addisonian pernicious anaemia with crude extracts, unless it can be shown that the latter will produce in human subjects beneficial effects differing from or greater than those which are obtained with a purified product. No satisfactory laboratory test for activity is available, and to assess the value of a

product for use in pernicious anaemia one must observe its effect under controlled conditions in a series of cases of the disease as it occurs in man.

The original Dakin and West's fraction was tested in this way in thirty-six cases of pernicious anaemia,[1] and a more purified product in twenty cases.[2] These and subsequent experiences have demonstrated the consistently high efficacy of this fraction for restoring and maintaining a normal blood status. The clinical effects are not less striking than those which follow the use of crude extracts, and there is in fact no evidence that Dakin and West's fraction lacks any element necessary for inducing complete remission of all those manifestations of pernicious anaemia which are susceptible to the influence of liver treatment.—I am, etc.,

Newcastle-on-Tyne, March 24. C. C. UNGLEY.

Gas-and-air Analgesia

SIR,—An article entitled "Gas-and-air Analgesia in Labour," appearing in your issue of March 20, contains the statement that "gas-and-air analgesia was first tried in October, 1933, by Dr. Minnitt of Liverpool, who adapted for his use an American nitrous oxide apparatus." May I point out that the latter half of this sentence is incorrect. If reference is made to the *Lancet* of June 16, 1934 (p. 1278, and to the *Proceedings of the Royal Society of Medicine*, August, 1934, vol. 27, Section of Anaesthetics, pages 33 to 38), it is there recorded that the apparatus devised for the purpose of giving gas and air was an adaptation of a McKesson oxygen-therapy apparatus.—I am, etc.,

Liverpool, March 27. R. J. MINNITT.

Terminal Caseating Tuberculous Bronchopneumonia

SIR,—I was very interested and gratified to read the article by Dr. C. E. H. Turner in the *Journal* of March 20 (p. 604) on the secondary infection of the lungs from caseating bronchial glands. Hilus tuberculosis is comparatively easy to diagnose by clinical signs in the adult. It is by no means uncommon in children, and though clinical signs are not nearly so definite when combined with a persistent irritating cough it is usually possible to make at least a provisional diagnosis. Clinical research, extending over a period of many years, forced me to the conclusion that secondary, or endogenous, infection from the bronchial glands was a common cause of pulmonary tuberculosis in the adult, and the results of my observations were published in the *British Medical Journal* in 1929 (August 24, p. 335). Experience has strengthened this view, and Dr. Turner's case is a further confirmation. Three cases which were under my observation as probably hilus tuberculosis suddenly, in a matter of hours, showed clear clinical evidence of extensive involvement of a lung, obviously of a tuberculous pneumonic type. In one case not only were tubercle bacilli found in the sputum but the radiograph showed clear evidence of spread from the root glands. It frequently happens that a latent tuberculous gland is suddenly reinfected from a bronchial catarrh, such as accompanies measles or influenza, which leads to a lowering of the focal and general resistance. Such glands are almost certainly adherent to the adjacent bronchus, and if the infection is acute the chances of a "break through" are far from negligible, the final result depending on the number and virulence of the tubercle bacilli present. The difficulty of finding tubercle bacilli in caseous material is well known, so that complete apparent recovery is not impossible. One such case was recently examined by *x* rays after an interval of seven years, and the lungs were reported normal, yet this same case shows periodic evidence of tuberculous toxaemia and physical signs in the lungs of a suggestive character whenever she catches cold, as she frequently does. I do not consider the prognosis good, and would hesitate to certify her as a normal insurance risk.

As often happens all three cases were under observation at the same time, including one diagnosed as acute tuberculous infection of the bronchial glands, which did not break down and led to pulmonary invasion. He has remained perfectly fit and free of any suspicion of pulmonary tuberculosis after a period of about ten years. Other cases have been observed, but none was quite so definite or dramatic in the sudden onset, yet there is every reason to believe that others arose in the same way, although more slowly and insidiously.—I am, etc.,

Birkenhead, March 22. D. J. GAIR JOHNSTON.

[1] Ungley, C. C., Davidson, L. S. P., and Wayne, E. J.: *Lancet*, 1936, **1**, 349.
[2] Ungley, C. C.: *Lancet*, 1936, **2**, 1513.

Radiograph or Skiagram

SIR,—With reference to Mr. Lawson's letter (*Journal*, March 20, p. 641) I hasten to disclaim responsibility for any "launching of a crusade for a more elegant term." My previous letter (*Journal*, March 6, p. 530) was essentially a protest against the suggested employment of the word "radiogram," on the reasoning that in the absence of a freshly coined and more acceptable one it is unwise to desert the word radiograph, which is in more general use among radiologists in this country.

In the correspondence to which I referred the words radiograph, skiagraph, roentgenograph, and their corresponding -grams were all discussed, and as etymological probing into their lineage appeared to have brought little credit to any of them my arguments were restricted to the question of usage, with special reference to the fact that radiogram has several generally accepted meanings.

Mr. Lawson's letter suggests that there would be no such potential confusion if the word "skiagram" were adopted, but reference to the nearest dictionary produces the following information:

"SCIAGRAPHY (or SKIA-). Art of shading in drawing, etc.; photography by roentgen rays; vertical section showing interior of house, etc.; finding of time by shadow as in sundial. So SCIAGRAPH, etc."

As skiagram in its application to an *x*-ray photograph entered the lists in the same few weeks of 1896 as did radiograph and radiogram—and skiagraph also—it had an equal chance of survival, but I venture to submit that it has no case.—I am, etc.,

Worthing, March 20. R. BOULTON MYLES.

The Medical Illustrator

SIR,—May I, as an artist who is now attached to a medical school after spending five years at an art school and the greater part of three years at a medical school with the intention of becoming a medical illustrator, be allowed to write a few words.

I was deeply interested to find in your issue of February 13 an article on medical illustration from a fellow artist, who has a true understanding of the ideals of what medical illustration should be and what the carrying out of these ideals involves. It certainly means long and arduous training—hence the personal details at the beginning of this letter—but this has yet to be appreciated by the majority of the British medical profession. The lack of under-

standing that medical illustration is a "specialist's job," which cannot be executed by people who merely "draw and paint a little," is responsible for the low standard prevalent in this country. We are far behind America and Germany in this respect.

The medical profession ought to realize that this specialized ancillary service must be given proper surroundings: much of the free-lance work is poor; indeed, many good artists who undertake it are eventually forced into commercial draughtsmanship because they cannot sacrifice themselves to the cheap production demanded of them.

The ideal solution to this problem is for each medical school, hospital, or clinic to employ an artist on the staff, and the artist should be prepared to be vitally interested in all stages of the research work, and (because of the previous training) should guide all the illustrative work of the department, which should include photography. I emphasize photography because these two branches are closely united. Good photography as an illustrative agent cannot be ignored; it is for the artist to combine the two and decide whether a specimen should be drawn or photographed. I know many artists will disagree with me, but I have found this essential, and I think medical illustrators should hold a broad-minded view when remembering the purpose of their work in medical research. Therefore the artist should be familiar with all branches of scientific photography, thus knowing the capacities and limitations of both sides.—I am, etc.,

London, March 13. Z. S.

Medical Aid in Southern Spain

SIR,—Since the fall of Malaga the plight of the wounded and the refugees in Southern Spain is very serious. My husband has taken a British University Ambulance Unit to Almeria and has succeeded in establishing a hospital, two front casualty clearing stations, a food station, and a children's hospital outside the town on the road to Lorca. He hopes to establish several more at intervals of twenty miles to the point where the railway begins to run again. The unit at present consists of Sir George Young, Miss Thurstan (the commandant), two nurses, three drivers, two cars, and an ambulance.

A woman doctor and two more nurses went out last week. There has been a wide response to appeals for supplies for the unit, but its work is severely hampered for lack of surgeons and staff. If any fully qualified doctors or surgeons were willing and able to go out it is certain that many more lives could be saved. Expenses out and back will be paid, and keep out there. If such there are, I should be most grateful if they would get in touch with me, in the first place, stating for how long they would be able to stay out.—I am, etc.,

30, Lower Belgrave Street, S.W.1, March 29. J. HELEN YOUNG.

The Old English Inn

SIR,—I notice that Lord Horder, in his address to the British Health Resorts Association at Bournemouth (*Journal*, March 20, p. 626), asked: "Where was the old English inn, the inn of Dickens, and Fielding, and Smollett, and Charles Lamb?" If we may judge by Dr. Tobias Smollett's description of his journey to the south of France in 1763 it is probably a good thing that these old inns in England and in France have disappeared and given place to the clean and comfortable hotels that we all know. Writing from Boulogne, Smollett lets himself go.

"Though I was well acquainted with the road to Dover, and made allowances accordingly, I could not help being chagrined at the bad accommodation and impudent imposition to which I was exposed. . . . I need not tell you that this is the worst road in England with respect to the conveniences of travelling, and must certainly impress foreigners with an unfavourable opinion of the nation in general. The chambers are in general cold and comfortless, the beds paltry, the cookery execrable, the wine poison, the attendance bad, the publicans insolent, and the bills extortion; there is not a drop of tolerable malt liquor to be had from London to Dover. . . . Dover is commonly termed a den of thieves; and I am afraid it is not altogether without reason that it has acquired this appellation. The people are said to live by piracy in time of war, and by smuggling and fleecing strangers in time of peace; but I will do them the justice to say they make no distinction between foreigners and natives."

Poor Smollett, his complaints of conditions in the French inns are even more severe, but he hints that he was sometimes "more than usually peevish, from the bad weather as well as from the dread of a fit of asthma with which I was threatened." One cannot accompany him on his journey from Boulogne to Nice by way of Paris, Fontainebleau, Dijon, Lyons, and Montpelier without sympathy in all his discomforts and grumbles.

The whole volume of his *Travels*, made up as it is of letters to friends, is full of interest and entertainment. —I am, etc.,

Cannes, March 20. A. A. WARDEN.

Obituary

ALEXANDER CORSAR STURROCK, M.D.

Consulting Physician, Salford Royal Hospital

Dr. Alexander Corsar Sturrock died at his home in Eccles, near Manchester, on March 27, at the age of 65. He was born at Linlithgow and studied at Edinburgh University, taking the Master of Arts degree in 1892. Afterwards he went on to the medical school and took the M.B., C.M. with first-class honours some four years later. In 1898 he gained the M.D. with a gold medal. For a short time he acted as an assistant in the physiological department at Edinburgh before being appointed house-surgeon to the Grimsby Hospital. In 1900 he was appointed resident medical officer to the Manchester Royal Infirmary for a period of two years, after which he began a busy and successful life in Eccles as a general practitioner. In 1906 he took the M.R.C.P.Lond. He served for two years in the Royal Army Medical Corps in Salonica and in France, and was mentioned in dispatches. Returning home after the war, with the rank of major, he took up consultant work in Manchester, being appointed to the honorary medical staff of the Salford Royal Hospital. He was at the same time an honorary physician to the Eccles and Patricroft hospitals. Dr. Corsar Sturrock was a member of the Manchester Medical and Pathological Societies, and was honorary secretary of the Lancashire and Cheshire Branch of the British Medical Association for the years 1923–7. About this time he developed a special interest in nervous and mental diseases, and took charge of an out-patient department at the Salford Royal Hospital, which was organized in association with the County Mental Hospital at Prestwich, and was at that time a new departure in general hospital practice. In collaboration with D. Orr he wrote a paper on the "Influence of the Sympathetic on Infections of the Central Nervous System."

Corsar Sturrock's opinion was often sought at the assizes when any question of the sanity of a prisoner arose.

The reports he gave on these occasions were fully and carefully made, and his evidence was always very clear-cut and difficult to shake in cross-examination. He was a keen politician, and had long been an active member of the Eccles and Swinton Parliamentary Division Conservative Association, of which he was president for ten years. He had been a county magistrate since 1930. He was a well-known figure in Manchester, and was always in demand as an after-dinner speaker. There is no doubt that his loss will be keenly felt by many of his friends in Manchester and Eccles.

JOHN D. MALCOLM, M.B., F.R.C.S.Ed.

Consulting Surgeon, Samaritan Free Hospital

Mr. John David Malcolm, who was in former years well known in gynaecological circles, died suddenly on March 20 at his home near Petersfield, Hampshire, where he had lived since retirement from active work. He was born on June 30, 1857, the son of John Malcolm, M.D., of Dundee, and received his medical education at Edinburgh and Guy's Hospital, graduating M.B., C.M.Ed. in 1881, and obtaining the M.R.C.S.Eng. diploma in 1883 and the F.R.C.S.Ed. in 1884. After serving in turn as resident house-physician and resident surgeon at the Edinburgh Royal Infirmary he came to London and secured appointment to the staff of the Samaritan Free Hospital and after forty years' service was elected consulting surgeon.

Mr. Malcolm joined the British Medical Association in 1884, and was honorary secretary of the Section of Obstetrics and Gynaecology at the Annual Meeting of 1900 at Ipswich. He had held office as president of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine, and in 1913 was awarded the Liston Victoria jubilee prize by the Royal College of Surgeons of Edinburgh. He published in 1893 a small book on the physiology of death from traumatic fever, and had written a study in abdominal surgery.

A. H. T. ANDREW, M.B.

That corner of Suffolk between the Stour and the Orwell has been robbed by death of a devoted doctor and a great gentleman. Herbert Andrew was born in Northampton in 1883, educated at Bedford Modern School and St. Edward's School, Oxford, and subsequently pursued his medical studies at Edinburgh University, where he graduated M.B., Ch.B. in 1910. Although a good footballer, holding a regular place in the Edinburgh University Rugby football fifteen, he was even in his undergraduate days a student of Nature, and much of his spare time was spent as befits a student of bird life in collecting, photographing, and stuffing ornithological specimens; he already loved his gun, rod, and artist's brush.

After qualification Andrew held various resident hospital appointments in Edinburgh, in Dublin, and at Northampton General Hospital, and finally settled in practice in Leiston, Suffolk, where he remained for fifteen years. He held a commission in the Territorial Army, and on the outbreak of war was attached to the 1st East Anglian Field Ambulance, serving through the Gallipoli campaign in the famous 29th Division. He was subsequently transferred with that division to France, where he belonged to the 88th Field Ambulance, and was also for a time attached to the 1st Royal Inniskilling Fusiliers. In 1917 and 1918 he worked in the casualty clearing zone, first as an anaesthetist; but finally realizing his laudable ambition of being appointed a surgeon, he served in that capacity in the 53rd Casualty Clearing Hospital till the armistice.

In 1927 he relinquished his practice at Leiston but, remaining faithful to the county of his adoption, transferred to Holbrook, where in addition to his ordinary work he became medical officer to the Royal Hospital Naval School in that village, an appointment which he held till his death. He was a member of the Suffolk Branch of the British Medical Association.

Two years of almost constant association as a tent-fellow during war-time cement a friendship that death alone can destroy, and although the mileage may have precluded frequent meetings in the years of peace the writer retains a vivid memory of a debonair officer, no matter how deplete of sleep and rest, indefatigable, self-sacrificing, and the most charming companion in a surgical team that any surgeon could desire: his affability and charm enhanced our popularity as a visiting team to other clearing stations in times of battle. At the service at the graveside last week we were reminded by the clergy who knew him in private life of his kindness and of his fortitude, and the huge concourse which came to his funeral would have surprised one who was himself so modest, but the tribute nevertheless convinced the mourner of the matchless worth of our British general practitioner. His fortitude was perhaps best shown in his final illness, for such were his sufferings that those who ministered to him can but rejoice that after his Calvary there has succeeded his Eastertide of peace.

G. GORDON-TAYLOR.

ROBERT GORDON McKERRON, M.D.

Emeritus Professor of Midwifery, University of Aberdeen

It is with deep regret that we record the death, in his seventy-fifth year, of Professor Robert Gordon McKerron at Edinburgh on March 21, after a brief illness. Born in Moray, he was educated in the University of Aberdeen, graduating with honours both in arts and medicine, later proceeding to the degree of M.D. After a short period as assistant to Dr. Bruce of Dingwall he returned to Aberdeen and commenced general practice. At the same time he was appointed assistant to the professor of physiology in the University. Even at that time his chief interest lay in midwifery, and he gave up the appointment in physiology to become assistant to the late Professor Stephenson, who occupied the chair of midwifery. Until 1912 he conducted a strenuous general practice, with specialization in midwifery and diseases of children, and held the posts of senior physician to the Sick Children's Hospital and physician to the Maternity Hospital.

In 1912 he was appointed to the Regius chair of midwifery in the University of Aberdeen, and held this post until he resigned in 1936. In spite of his many duties he was able to carry a heavy share of the burden during the great war as a major in the Scottish General Hospital in Aberdeen. Until 1936 he was gynaecologist to the Royal Infirmary. He was the pioneer of ante-natal clinics in the North, and served for many years on the Central Midwives Board for Scotland. In addition, he was a member of the British Medical Association for forty years, was a vice-president of the Section of Obstetrics and Gynaecology at the Annual Meeting in Aberdeen in 1914, and was president of the Aberdeen Branch from 1927 to 1929.

Robert Gordon McKerron will be remembered for many qualities. As a man he was sincere and direct to a degree. His vitality was amazing, and in his younger days fatigue was unknown to him. The best of company, he was the life and soul of any gathering, and no senior students' dinner was complete without his genial presence. As a teacher his lectures were dogmatic and practical, leavened with a lively wit, and he was adored by his

students. He encouraged his pupils to use their mother wit rather than to depend on mere book knowledge. Sport was his lifelong interest, chiefly as regards Rugby football, cricket, golf, and bridge. He was chairman of the University Athletic Association and a former captain of the Royal Aberdeen Golf Club.

He died in Edinburgh on a visit to see the Rugby international; and so his life ended, as he himself would have wished it, with mental powers unabated. Those who were honoured by his friendship have sustained a loss which can never be replaced. His rugged Scottish character seemed to stand like one of those ancient landmarks, immune to time and tide: but he is gone, and we mourn a vivid personality with wide human sympathies and outlook. To the widow and family of two sons and three daughters we extend heartfelt sympathy.

R. S.

With the death of Dr. HENRY GIBBONS, J.P., of Desborough, near Kettering, on March 2, at the age of 77, the British Medical Association has lost a member of fifty years' standing, who had been active in its service. Born in India, he came to England at the age of 16 and entered Cooper's Hill Engineering College, but later went to Aberdeen and decided to adopt medicine as his profession. He graduated M.B., C.M.Aberdeen in 1883, and proceeded M.D. in 1904. After working as assistant at Street, Somerset, he went to live at Desborough, where he built up a large private practice, became medical officer of health of the urban district, and was public vaccinator and certifying factory surgeon. For thirty-five years Dr. Gibbons did pioneer work in placing the public health services of the town on a modern basis, establishing a sound sanitary system and stamping out such epidemics as typhoid fever, which were at first prevalent. He had been chairman of the Desborough Education Committee, and despite the urgent claims of private practice he took an active interest in many other local affairs; he was for many years a divisional surgeon in the St. John Ambulance Brigade, and had been president of the cricket club. His wife, who predeceased him last year, ably seconded his efforts, notably in connexion with the Desborough Nursing Association, for which she provided a site for the nurses' cottage. In the British Medical Association Dr. Henry Gibbons served on the Executive Committee of the old Northamptonshire Division and held office as Vice-Chairman of the Division in 1923; he was also a member of the South Midland Branch Council in 1924-6. Although in poor health for the last five years, he remained in active practice almost until the day of his death. On retirement from the appointment of medical officer of health in March, 1934, he received many tokens of gratitude and esteem for his work, and his portrait was placed in the council chamber. He was joined in his private practice by his son, Dr. Gerald Gibbons of Rothwell, who is well known to many members of the Representative Body of the B.M.A.

We regret to announce the death on February 26, at the early age of 34, of Dr. GILBERT COCHRANE, medical officer of health for Bromsgrove. The eldest son of Mr. Gilbert Cochrane of Edinburgh, he studied medicine at the University of Glasgow, graduating M.B., Ch.B., in 1923. After a period as house-physician to the Staffordshire General Infirmary Dr. Cochrane settled at Bromsgrove, and was appointed M.O.H. for the district, medical officer to the Bromsgrove, Droitwich, and Redditch Joint Isolation Hospital, and medical superintendent to the Hilltop Sanatorium; he was also medical officer to Bromsgrove School and to the local cottage hospital. He was a Fellow of the Society of Medical Officers of Health, a member of the Medical Officers of Schools Association, and from 1928 to 1933 honorary secretary of the Bromsgrove Division of the British Medical Association.

Universities and Colleges

UNIVERSITY OF LIVERPOOL

The following candidates have been approved at the examinations indicated:

M.CH.ORTH.—F. C. Dwyer, T. U. Ley.

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.—*Part A:* M. J. Brady, J. Courtney, T. F. J. O'Farrell, J. A. Ross.

DIPLOMA IN PUBLIC HEALTH.—*Part I:* E. Agius, J. A. Bentham, R. T. Bowes, H. R. G. Davies, A. Dodd, Bessie Dodd, J. G. Hailwood, Joy C. Lowe.

DIPLOMA IN TROPICAL MEDICINE.—P. G. Barrow, A. H. Casson, G. V. Craine, F. W. Crook, S. K. Ghose, Roberta I. Hutchinson, C. H. Kotak, I. Luanprida, *G. B. Ludlam, Y. M. Siddique, S. H. R. Syed, Luise Wislicki.

DIPLOMA IN TROPICAL HYGIENE.—J. E. O. Amegatcher, E. Bradbury, M. H. Gomaah, B. J. Green, S. Hazra, J. D. Robertson, S. Saleem, T. S. Subramaniam, J. W. Summerheyes.

* Recommended for A. H. Milne Medal.

UNIVERSITY OF LEEDS

The following candidates have been approved at the examinations indicated:

M.D.—L. Glick, E. H. Kitching, L. Nagley, A. B. Raper, J. F. Warin.

FINAL M.B., CH.B.—*Part I:* J. Braham, T. E. Broadbent, D. Brook, W. L. Carruthers, J. Cross, J. K. Drucquer, D. B. Feather, Dorothy Haigh, E. Hyman, E. W. Jackson, W. R. Jackson, R. A. S. Keighley, E. S. Levy, S. Madden, Kathleen V. Miller, R. Orton, J. Overton, G. F. Reid, J. F. Robinson, J. W. Scholey, S. H. Segerman, W. M. H. Shaw, I. S. Stewart, A. W. Taylor, A. P. B. Wind, A. J. Ward, T. I. Watkins, D. C. Williams, Kathleen Wilson, K. B. Wood. *Part II:* K. B. Aske, A. A. Driver, R. W. Ellis, V. P. Geognegan, I. R. Gray, G. W. Green, G. W. V. Greig, T. Hardy, Gwyneth M. Hosking, K. K. Hussain, S. Lask, R. F. Lawrence, N. Livingstone, Agnes M. Mitchell, F. P. Raper, J. A. Rhind, A. H. Rhodes, Joyce M. Rhodes, I. D. Riley, C. H. Robinson, G. B. Robinson, H. Silverman, J. C. T. Sykes, D. Taverner, H. Thistlethwaite, L. G. Topham, Mary Townend, Leila M. Wainman, J. W. Walker, F. J. D. Webster. *Part III:* *J. A. Rhind, †A. A. Driver, †I. R. Gray, †G. W. Green, †G. W. V. Greig, †I. D. Riley, †D. Taverner, Rosemarie Blackwood, R. W. Ellis, T. Hardy, Gwyneth M. Hosking, K. K. Hussain, S. Lask, R. F. Lawrence, N. Livingstone, Agnes H. Mitchell, F. P. Raper, A. H. Rhodes, Joyce M. Rhodes, C. H. Robinson, G. B. Robinson, J. C. T. Sykes, H. Thistlethwaite, L. G. Topham, Leila M. Wainman, J. W. Walker, F. J. D. Webster.

D.P.H.—A. D. B. Broughton.

* First-class honours. † Second-class honours.

The following scholarship and prizes have been awarded: *Infirmary Scholarship:* H. Petty. Littlewood Prize in *Anatomy:* R. B. Zachary. *Scattergood Prize in Obstetrics and Gynaecology and the Hardwick Prize in Clinical Medicine:* J. A. Rhind. *McGill Prize in Clinical Surgery and the Edward Ward Memorial Prize in Surgical Anatomy:* I. D. Riley.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

At a meeting of the Royal College of Physicians held on March 22 Viscount Dawson of Penn was re-elected President.

Sir Francis Fremantle was appointed a delegate to the Conference of the Imperial Social Hygiene Council to be held in London from July 5 to 9.

A licence to practise was granted to W. J. C. Crisp, who has passed the final examination of the Conjoint Board and has complied with the by-laws.

Diplomas in medical radiology were conferred, jointly with the Royal College of Surgeons of England, upon G. G. Binnie, F. Constant, Mary J. Cronin, and J. M. Lees.

Diplomas in Ophthalmic Medicine and Surgery were conferred, jointly with the Royal College of Surgeons of England, upon the twenty-seven candidates whose names were published in the report of the meeting of the Royal College of Surgeons of England printed in the *Journal* of March 20 (p. 643).

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—C. L. Blacklock, K. G. Pascall, R. A. Stenhouse, R. G. Stitt, G. Theophilus, R. H. S. Thompson, T. Van der Walt, W. W. Willson.

MEDICINE.—V. M. Attenborough.

FORENSIC MEDICINE.—V. M. Attenborough.

MIDWIFERY.—W. J. Bold, E. E. Bullock, E. S. Reed, F. J. C. Smith, G. Theophilus, W. W. Willson, W. G. Zorab.

The diploma of the Society has been granted to C. L. Blacklock, S. G. Stitt, G. Theophilus, and W. W. Willson.

The Services

INDIAN MEDICAL SERVICE

REORGANIZATION UNDER NEW CONSTITUTION

The following statement received for publication from the India Office announces a reorganization of the Military Medical Services in India, which takes effect from April 1, 1937, the date on which Provincial Autonomy came into operation under the new Constitution.

The changes in the organization, distribution, and terms of service which will be introduced are the result of a prolonged investigation, extending over more than three years, into the whole military medical organization both for peace and war. The main features are as follows:

ESTABLISHMENTS

The strengths of the three military medical services in India —the R.A.M.C. borne on the Indian Establishment, and the military branches of the I.M.S., and the I.M.D.—will be fixed so as to provide for the minimum medical requirements of British and Indian troops in peace.

For the purposes of maintaining a War Reserve, on which the Army in India must rely for its increased requirements in an emergency; providing for attendance on British members of the superior Civil Services and their families; and filling posts under the Central Government and the Crown Representative, there will continue to be a Civil Branch of the I.M.S., recruited as hitherto from the military branch. It will consist of no fewer than 220 officers, of whom 166 will be British.

A new list of posts reserved for I.M.S. officers in civil employ has been adopted, involving a net reduction in the number of posts so reserved for British and Indian officers from 207 to 172, but the existing rights of officers already in civil employment will be fully preserved and prospects equivalent to those afforded at present will be retained for them.

RECRUITMENT

Recruitment for the I.M.S. will continue, as at present, to be conducted by nomination on the recommendation of a Selection Board. Indian members will be recruited in India, and will normally be given short service commissions for five years, after which selection will be made for permanent commissions from among those who desire to continue in the Service. British doctors will continue to be recruited in London and will be appointed to permanent commissions to all European vacancies. Selections will be held four times a year, as hitherto, in April, July, October, and December.

PAY, PROMOTION, AND PENSION

Revised rates of pay for future entrants have been introduced so as to bring basic pay more into accord with Indian standards, without materially altering the total emoluments which will be admissible to British members of the Service who draw sterling overseas pay. At the same time the time-scale of promotion to major has been accelerated by two years, both for existing incumbents and new entrants. Improvements have also been made in the rates of pay drawn in the second, third, eleventh, and twelfth years of service.

An increased outfit allowance of £75 will be granted to new entrants, and the maximum period of antedate for high qualifications and special experience is raised from one year to eighteen months.

Six additional colonelcies will be provided on the military side of the I.M.S., and a suitable number of enhanced pensions, equal to colonels' pensions, will eventually be provided and awarded to officers on the civil side.

CONDITIONS OF SERVICE IN CIVIL EMPLOYMENT

An officer transferred to civil employment will be on probation for two years. If continued in civil employ thereafter he will retain a right to revert to military employment under certain conditions until he has spent seven years in civil employment or has had seventeen years' total service; after this period he will, if it is agreed that he shall remain in civil employment, be transferred to a special supplementary list, and will not normally be eligible for military promotion above the rank of lieut.-colonel. This system follows that in vogue for other military officers in civil employ—for example, in the Indian Political Department.

India Office, March 24, 1937.

ROYAL NAVY MEDICAL CLUB

The twenty-third annual dinner of the Royal Navy Medical Club will be held at the Trocadero Restaurant, W., on Friday, April 16, at 8 p.m., preceded by a general meeting at 7.30 p.m. Information can be obtained from the honorary secretary, Surgeon Commander M. B. Macleod, R.N., Medical Department, Admiralty, S.W.1.

COMMISSIONS IN THE R.A.M.C.

The War Office announces that applications are invited from medical men for appointment to commissions in the Royal Army Medical Corps. Candidates will be selected for commissions without competitive examination, and will be required to present themselves in London for interview and physical examination on or about April 22, 1937. They must be registered under the Medical Acts, and normally must not be over the age of 28 years.

Successful candidates will in the first instance be given short service commissions for five years. During the fourth year of this period they will be given the opportunity of applying for a permanent commission. Those not selected will retire on completion of five years' service with a gratuity of £1,000.

Full particulars of the conditions of service and emoluments, also forms of application, may be obtained on application, either by letter or in person, to the Assistant Director-General, Army Medical Services, The War Office, London, S.W.1.

KEOGH BARRACKS

The Army Council has decided to name the new barracks about to be built for the Royal Army Medical Corps Depot and Army School of Hygiene at Aldershot the "Keogh Barracks" in memory of the late Lieutenant-General Sir Alfred Keogh, G.C.B., G.C.V.O., C.H. That very distinguished officer was Director-General Army Medical Services from 1905 to 1910 and again during the Great War from 1914 to 1918.

Medical Notes in Parliament

On March 25, before Parliament rose for the Easter Recess, the Royal Assent was given to the Consolidated Fund Act, the East Hertfordshire Joint Hospital District Act, the Waltham Joint Hospital District Act, and the Wisbech Joint Isolation Hospital District Act. The House of Commons adjourned till April 6 and the House of Lords till April 7.

The Public Health (Drainage of Trade Premises) Bill was read the third time and passed by the House of Lords on March 23. On the same day the Marquess of Dufferin and Ava introduced a Bill to provide for the regulation of the fumigation of premises and articles by hydrogen cyanide. The Bill was read a first time.

In the House of Commons on March 23 Mr. Baldwin introduced the Ministers of the Crown Bill. The object of the Bill is to regulate the salaries payable in respect of certain administrative offices of State; to provide for the payment of additional salaries to members of the Cabinet holding offices at salaries less than £5,000 a year, of a salary to any person being Prime

Minister, of pensions to persons who have been Prime Minister, and of a salary to any person being Leader of the Opposition; and to simplify the law as to the capacity of persons holding offices of profit to sit and vote in Parliament. On the same day the National Health Insurance Act (Amendment) Bill was read a third time in the Commons. It had been read a second time on March 22.

The annual report of the Department of Health for Scotland (1936) was presented to Parliament on March 23.

The Conservative Committee on Nutrition was addressed at the House of Commons on March 24 by Lord Astor on the examination of nutrition problems abroad and at the League of Nations.

An Order for Alteration of Coroners' Districts in the County of Denbigh was laid on the table on March 24.

On March 24 the Northern Group of M.P.s received a deputation about the report of the Select Committee on the Medicine Stamp Duties. The deputation, which was from the Newcastle and Northumberland Branch of the Pharmaceutical Society of Great Britain, argued that it was unfair for "everyday" medicines and medicaments to be taxed because advisory directions were printed on the labels. The committee promised consideration of the matter.

Housing in Scotland

On March 23 Mr. ELLIOT told Mr. Mathers that he had conferred with employers and operatives representing practically all the organizations in the building industry in Scotland. Information had been placed before the building industry showing the public work (including houses, schools, and hospitals) that it was desired to carry out within the next few years. It was his intention to submit proposals to Parliament at the appropriate time for the continuance of the present rates of Exchequer contributions under the Housing (Scotland) Act, 1930, and the Housing (Scotland) Act, 1935, for the three years beginning on April 1, 1938; that was to March, 1941. He was arranging for meetings with the Association of Local Authorities to discuss the question of planning their building programmes so as to ensure the maximum degree of continuity of progress. A preliminary meeting was held in Edinburgh that morning. A further meeting with the representatives of the building industry was being held in Glasgow that day. He had every reason to think that when the negotiations were concluded there would be made possible a marked improvement in the recent rates of house building.

Extension of Subsidies for Slum Clearance

Replying on March 23 to Mr. Wilfrid Roberts, Sir KINGSLEY WOOD said that under Section 109 of the Housing Act, 1936, he was called on to review after October 1, 1937, in consultation with the local authorities, the Exchequer contributions payable for slum clearance and the abatement of overcrowding. The section provided that contributions at the existing rates would be payable for houses completed by March 31, 1938. The completion of slum clearance and the abatement of overcrowding were vital elements in the health services of the country. He was anxious to preserve the continuity in this housing programme. When he submitted proposals it was his intention to include among them provisions under which the new existing rates of Exchequer contribution would continue without alteration for houses built in replacement of unfit houses or for the abatement of overcrowding which were completed by December 31, 1938.

Capitation Fee and Insurance of Juveniles

Mr. ROBERT HUDSON told Mr. Rhys Davies on March 24 that he could add nothing to previous statements in reply to inquiries about the date on which the National Health Insurance scheme would be amended to bring in young persons on entry into employment.

Mr. DAVIES: Are we right in assuming that the medical profession's objections to the fee that has to be paid in the case of these boys and girls are holding up the Government's legislation?

Mr. HUDSON: No, Sir. I said in my reply that the matter had been connected with the larger question of fees and that my right hon. friend had agreed to the suggestion that the whole matter should be referred to an independent court of inquiry.

Mr. DAVIES: Is it not a fact that the medical profession declined to accept the offer of the panel fee suggested, and because of that the medical profession is holding up the Government's legislation?

Mr. HUDSON: That is not altogether a complete description.

Report on Medicine Stamp Duties

On March 25 Mr. I. C. HANNAH asked the Chancellor of the Exchequer, before deciding to adopt the duties recommended by the Select Committee on Medicine Stamp Duties, to consider that the comprehensive taxes on medicine proposed by the Committee would affect the poorer classes while hardly touching the rich, and that the small chemists took objection. Col. COLVILLE replied that before Mr. Chamberlain reached a decision on the Committee's report due weight would be given to all relevant considerations.

Midwives Act: Qualifications of Midwives

On March 25 Mr. VIANT asked whether the Minister of Health, in issuing regulations in connexion with the Midwives Act, instructed medical officers of health when making appointments to confine such appointments to those who possessed a certificate in midwifery and also the certificate of a State-registered nurse. Sir KINGSLEY WOOD answered that the Midwives Act, 1936, did not empower him to issue regulations with regard to the qualifications of midwives to be appointed under the Act. In the circular which he addressed to local supervising authorities on September 18, 1936, he drew attention to the importance of absorbing into the new service as many as possible of the independent midwives at present in practice. The circular made no suggestion that appointments should be confined to midwives who were State-registered nurses. He added that he deprecated any such limitation in the appointments first made by local supervising authorities under the Act.

Insured Persons Not Choosing a Panel Doctor

In each of the five years 1932 to 1936 the number of insured persons in England and Wales who, although entitled to medical benefit, had not chosen an insurance doctor, was on the average about 495,000. Sir KINGSLEY WOOD cannot give a similar figure of the number of persons who have chosen a doctor but have not used his services.

Card Room Workers: Committee on Compensation

Sir JOHN SIMON has appointed a committee to consider and report whether an equitable and workable scheme can be devised for providing compensation in the case of persons who, after employment for a substantial period in card rooms or certain other dusty parts of cotton-spinning mills, become or had become disabled by respiratory illness as indicated in the Report of the Departmental Committee on dust in card rooms; and if so to make detailed recommendations as to the provisions to be included in such a scheme, more especially as to the persons to whom benefit should be payable and the rates and conditions of benefit, the medical and other machinery for administering the scheme, the method of financing the scheme, and its approximate cost. Included in the committee is Professor George R. Murray.

Dispensing Under National Health Insurance Act.—In the House of Commons on March 23, Sir KINGSLEY WOOD moved the Second Reading of the National Health Insurance Act (Amendment) Bill. He said that the Bill was virtually a drafting amendment to a section of the National Health Insurance Act, 1936, which prescribed the class of persons entitled to undertake the dispensing of medicine under that Act. Section 41 of the Act described these persons by a reference to their rights under the Pharmacy and Poisons Act to use the title of chemists and druggists. It had been found that these words did not meet the case of corporate bodies, and to enable these corporate bodies, employing qualified chemists, to participate in the insurance scheme the Bill had been introduced. The Bill was read a second time.

Model Diets in Mental Hospitals.—Sir KINGSLEY WOOD, on March 23, informed Mrs. Tate that a number of mental hospitals had adopted a dietary for a four-week period, though he was not aware of the exact number. The matter was determined by the visiting committee of the local authority generally on the advice of the medical superintendent. The standards recommended by the Committee on Dietaries had been generally adopted.

Salary Limit for Unemployment Insurance.—Mr. ERNEST BROWN told Mr. Dingle Foot on March 24 that he had taken note of the request from the National Federation of Professional Workers for the raising of the salary limit in unemployment insurance to £500 a year. The Secretary of the Federation, Mr. Brown added, had been informed that the question was under consideration.

Alleged Infection in Imported Eggs.—Sir JOHN WARDLAW-MILNE declared on March 25 that the superintendent of one of the Japanese Government hygienic institutions reported that Chinese eggs had been found in certain instances to contain the bacilli of tuberculosis, of syphilis, and of typhoid fever. Sir John asked what action had been taken in this country to ensure that eggs of this kind imported here were not so infected. Sir KINGSLEY WOOD did not know of this report but promised to have inquiries made. He added that examinations of Chinese eggs made in the laboratory of the Ministry of Health had not revealed the presence of any disease-producing organisms.

Spirochaetal Jaundice.—Sir JOHN SIMON told Mr. Windsor on March 25 that the drafting of the Order scheduling spirochaetal jaundice as an industrial disease, as recommended by a Home Office Committee, had been found to raise points of difficulty. These were being gone into, and he hoped the matter would be settled at an early date.

The Case for Quinquennial Census.—With regard to representations made to the Ministry of Health by a scientic deputation, by the Royal Statistical Society, and by the Association of Medical Officers of Health in favour of a quinquennial census, Mr. CECIL WILSON asked how far these representations had received favourable consideration; and whether, in view of the rapidity with which changes in the location and occupation of the population were taking place and the necessity for accurate information, the Minister of Health would consider the desirability of taking the census quinquennially. Sir KINGSLEY WOOD said he had received no representations on this subject recently. A census was due to be taken in 1941. After that date the question of a quinquennial series will be reviewed.

Notes in Brief

Draft regulations under the Petroleum (Consolidation) Act, 1928, to control the conveyance by road of a number of dangerous substances, including sulphuric acid, have been prepared in consultation with the interests affected, and will soon be issued.

The report on home-work set in schools is now in the hands of the printers, but is unlikely to be published before the end of May.

Medical News

It is officially announced that H.M. the Queen, Commandant-in-Chief of the Nursing Corps and Divisions of the St. John Ambulance Brigade, has appointed H.R.H. the Duchess of Gloucester as her Deputy. Her Royal Highness is a Dame Grand Cross of the Order of St. John, and is the third member of the Royal Family to hold an official and active appointment in the Brigade.

A ball in aid of St. Bartholomew's Hospital will be held at the Dorchester Hotel, Park Lane, W.1, on Tuesday, April 20. There will be dancing from 10 p.m. till 3 a.m., with cabarets, sideshows, etc. Tickets (inclusive of dinner with champagne and buffet) are two guineas each, obtainable from St. Bartholomew's Hospital, or the Dorchester Hotel ,or the organizer of the ball (Mrs. Madge Clarke, 20, Bruton Street, W.1).

The annual oration before the London Jewish Hospital Medical Society will be given by Professor Samson Wright, M.D., on Thursday, April 8, at 4 p.m., at the London Jewish Hospital. His subject is "Social Organization in the Living Body."

A meeting of the Listerian Society of King's College Hospital will be held in the lecture theatre at the hospital, Denmark Hill, S.E., on Wednesday, April 7, at 8.15 p.m., when Sir Walter Langdon-Brown will give an address on "The Integration of the Endocrine System." Medical students and practitioners are invited to attend.

A meeting of the Committee for the Study and Investigation of Rheumatism will be held at the Red Cross Clinic, Peto Place, W.1, on Tuesday, April 6, at 5.30 p.m. Cases will be shown, and an invitation to be present is extended to medical practitioners interested in the subject.

A course in laryngology and phonetics will be held in the Bellan Hospital, Rue de Texel 7, Paris, from Monday, May 31, to Saturday, June 5, by Dr. J. Tarneaud (oto-rhino-laryngologist to the hospital), with the assistance of Drs. R. Husson, P. Kucharski, and Mme Borel-Maisonny. The course will comprise clinical and cinematographic demonstrations, in addition to lectures on the associated pathological, therapeutic, and educational considerations. The fee is 200 francs, and fuller information may be obtained from Dr. Tarneaud, Avenue de la Grand Armee 27, Paris XVI.

A practical and theoretical course in broncho-oesophagoscopy will be held at the Hôpital Lariboisière, Paris, from May 10 to 15, under the direction of Dr. André Aubin. The fee is 500 francs. Further information can be obtained from 17 Rue du Fer-à-Moulin, Paris.

The new building for the Helen Chambers Research Laboratories, which Queen Mary opened on March 19 at the Marie Curie Hospital (see *Journal*, March 27, p. 678) is situated between the two existing blocks of the hospital, to which it has direct access by means of covered ways. The laboratories, which occupy its upper story, have been planned to afford facilities for carrying out the routine pathology of the hospital, as well as for the development of work in cancer research, with particular regard to the experimental approach. One laboratory is equipped for routine clinical pathology and histology. Separate rooms are provided for bacteriology and for biochemistry. Two rooms are equipped to house animals for work in experimental pathology, and the pathologist's private room is also fitted as a research laboratory. A sterilization room and a room for the preparation of media and a mess room for the technical assistants complete the unit, which is in charge of Dr. Mary Gilmour under the general direction of Dr. Elizabeth Hurdon.

The chairman and treasurer of the General Infirmary at Leeds stated at the annual meeting of the Governors that for the first time in twenty-five years the Infirmary had been able to balance its budget.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the *Journal*, should be addressed to the Financial Secretary and Business Manager.

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The TELEGRAPHIC ADDRESSES are

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MEDICAL SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh), and of the Office of the Irish Free State Medical Union (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin*; telephone 62550 Dublin).

QUERIES AND ANSWERS

Broken Sleep in Middle Age

"NORTHERN IRELAND," in reply to "SUSSEX" (*Journal*, March 20, p. 649), writes: "I would not advise sedatives on account of his 'debility' and low blood pressure. Many professional men, and especially Stock Exchange brokers, suffer from an inability to banish work and prices from their minds on retiring, with the result that 'the first exhaustion over, their brains bring them to the surface again' in the small hours. I should advise a light meal not later than two hours before retiring, and a cutting down to the minimum of alcohol and tobacco. Deep-breathing exercises with complete muscular relaxation should be begun and then a few simple raising and bending exercises for trunk and legs should be introduced. If the heart is sound, these should be performed vigorously until the patient is slightly out of breath, and in a week the gain in vitality will be amazing. The whole thing should not take more than ten minutes in the bedroom, and afterwards sleep should be continuous till 7 a.m. If, however, the patient still wakes at 3 a.m., I should instruct him to get up and walk round the room in night attire, breathing deeply, until he begins to feel chilly. He should then get into his warm bed and the grateful heat should soon settle him off. I would also suggest warm bed socks and two anti-flatus pills on retiring."

Painful Feet

"PERPLEXED" would welcome suggestions in the following case: A lady aged 69 had typhoid fifty years ago. Since then she has suffered from painful feet. Locomotion is only possible by walking on the heels. In the right foot the third metatarso-phalangeal joint which protruded into the sole was treated operatively and the nerves sectioned, but the pain persists. Both arches are flattened. All varieties of shoes with special insteps have been tried without avail. Callosities are present, especially on the pads and the large toe joint. Chiropody is invoked periodically, and various orthopaedic surgeons have been consulted. Are there such aids as pneumatic soles available?

Income Tax

Proportion of General Expenses

"G" occupies a house which has six rooms and a garage on the ground floor, and eight rooms upstairs. The garage and four downstair rooms are used for patients. The inspector of taxes refuses to continue the previous allowance of one-half the rent, rates, etc., as applicable to the practice. "G" keeps a cook and two maids, and a similar refusal has been met to the claim for one-half the cost as hitherto.

*** As regards the rent, rates, etc., it has to be remembered that the ground floor of a house is always considered to have a higher letting value than the upper floors, and advise "G" to adhere to his claim and press it to appeal if necessary. With regard to the domestic service, however, one maid is normally considered adequate for looking after the professional use of the premises, and "G" may be wise to compromise on a deduction of one-third instead of the former one-half.

LETTERS, NOTES, ETC.

Herpes Zoster and Varicella

Dr. J. G. BENNETT (Hyde, Cheshire) writes: The following case of coincident herpes zoster and varicella will possibly interest readers of the notes in the *Journal* in the past few months. Although the conditions are closely connected it has not up to the present been established how this co-relation works. We have proof that an epidemic of chicken-pox is frequently present when herpes zoster is prevalent, but it has not been my lot to see the two lesions occur in one person at the same time. A chemist, aged 36, consulted me in regard to severe neuralgia in the right side of his head. There was no apparent cause for his neuralgia, and I prescribed an aconite and gelsemin mixture. He returned in a few days no better, and was then given luminal sodium grain 1/2 t.i.d., which seemed to afford some relief. A week later he developed a severe attack of right-sided herpes zoster of the fifth nerve, and became very ill, with vesicles all over the right side of his forehead and cheek, which rapidly involved the eyelids and caused a keratitis of the globe of the eye. He was given 1 c.cm. of pituitrin. On the following day he taxed me with having caused a rash to break out on his body as a result of my injection. The "rash" proved to be a typical papular varicella, which later developed true pustules. There were a few pustules on the hard palate, and quite a number have left pitted scars on the chest. Coincidentally, the herpes zoster is clearing up rapidly, and the keratitis is also resolving. It seems to me to be very interesting to find the two conditions occurring practically *pari passu*, although I am at a loss to understand the connexion between them.

What About Ourselves?

Dr. C. J. HILL AITKEN (Rotherham) writes: Lord Horder asked "And what about ourselves?" in his Hunterian Oration (*Journal*, February 27, p. 462). Some years ago I was told by a doctor, as an example of how the South African native believed in magic, that following the examination of a child's throat with a tongue spatula the father of the child told his friends how the doctor had cured the child's sore throat by looking inside the mouth of the child. Thought of this came to me as I examined a quinsy and noticed pus oozing from the supratonsillar fossa above the right tonsil, the side of the quinsy. The light was good, the patient opened his mouth satisfactorily, and the tonsil had been clean when I started the examination with a spoon. Evidently depressing the tongue caused the opening into the fossa to gape and so pus could escape. The patient volunteered the information that the spoon examination gave him relief on each occasion. What I observed in this case would account for a patient who tells me he "cured" his quinsy by swallowing half an orange. The bulk of the half orange presumably would depress the tongue and so open the mouth of the fossa and allow the pus to escape.

Late Menopause

Dr. D. J. CONNOLLY writes: The following menstrual history may be of interest to the profession. A woman, now 78 years old, started to menstruate at or about the age of 11. The menopause finally ended when she was 62. She married when 18 years of age, and had had four children by the time she completed her twenty-fifth year. Three of these are still living; the fourth died in infancy. Her husband died sixteen years ago. There was no further issue of the marriage. She menstruated regularly up to her sixty-first year, and during the last twelve months of the menopause the menses were irregular until their final cessation. She breast-fed her children, and after the first child's lactation the breasts increased in size very much and have remained large to the present day. There was not at any time during her married life any contraceptive method tried. The points to be noted are, I think: (1) the sudden cessation of reproduction; (2) the hypertrophy of the mammary glands; (3) the lateness of the menopause.